# BEHAVIOUR MODIFICATION

# IN

# MENTAL DEFICIENCY NURSING

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# ABSTRACT OF THESIS

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*Title of Thesis* BEHAVIOUR MODIFICATION IN MENTAL DEFICIENCY NURSING

The conventional custodial approach in mental deficiency nursing is no longer appropriate, according to current policy, to the needs of mental defectives. Behaviour modification is singularly effective in overcoming behavioural problems and deficits associated with mental deficiency. The present research investigates some implications of behaviour modification for mental deficiency nursing.

An experimental study evaluated the effectiveness and practicability of the implementation, by nurses, of a behaviour modification toilet training programme for a group of low-grade mental defectives in a typical institutional environment. Twenty-seven of the thirty-five patients involved achieved a reduction in incontinence and acquired an improved level of independent toilet behaviour. The overall prevalence of incontinence in the ward decreased as did the amount of linen used due to incontinence. Most patients evidenced an acceleration of progress in general level of functioning concurrently with the toilet training period. It appears that response generalisation may be an effect of specific training. A replicative experiment, involving the original control group as subjects, achieved similar results in all respects. Long-term evaluation produced no evidence of regression to pre-training level of performance. The study suggests that behaviour modification toilet training provides an effective, enduring and practicable solution which could be applied by nurses to the considerable problem of incontinence in mental deficiency hospitals.

A survey study ascertained the nature and extent of nurse involvement in behaviour modification. Nurses in the majority of mental deficiency hospitals in Scotland were found to be involved in a variety of behaviour modification activities. These activities are discussed and aspects of the role, function and training of nurses in behaviour modification are discussed.

It is concluded that behaviour modification can make a significant contribution to the development of a therapeutic component in mental deficiency nursing.

*Use other side if necessary.*

# DECLARATION

I declare that the research reported in this Thesis was undertaken by myself and that the Thesis has been written by myself.

Signed

Alison J. Tierney.

Acknowledgements.

I am aware of the debt of gratitude I owe to the many people who have been involved in aspects of this research. They have contributed, in various ways, help and support, inspiration and encouragement.

My working base throughout the period of study has been the Department of Nursing Studies in the University of Edinburgh. I am grateful to Professor M. Scott Wright and Miss L.Hockey for the various facilities and expertise which have been made available to me in the Department and the Nursing Research Unit. I have appreciated the personal encouragement and support of my fellow research students and colleagues.

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Miss A. Altschul and Dr. D.A. Primrose have acted as my academic supervisors. Miss Altschul encouraged me to embark on the study in the first instance and, having done so, did not fail to sustain her interest in it. Dr. Primrose provided invaluable clinical supervision during the experimental study. Both supervisors have given generously of their time and experience, and I am indebted to them on this account.

The nursing staff involved in the experimental study must be given all credit for any positive outcomes of the study and be absolved from any criticism of its shortcomings. These nurses endured the rigours of a demanding and lengthy project and, despite any reservations they may have had, gave energy, time and patience

to the study. I look back on my association with them as an enjoyable and stimulating experience. My thanks to all the nursing staff are expressed and, in particular, to Sisters A. Baxter and E. Nelson and Miss H. Kekstadt (P.N.O.).

In the survey study, and during initial pilot work, many staff members of mental deficiency hospitals through Scotland provided facilities and information. Acknowledgement is noted to all of those individuals (nurses, doctors and psychologists) who were involved.

My husband, Ian, is the one individual who has been totally involved with the research from its inception. I know that the completion of this thesis will be his reward for his unfailing encouragement and hisunselfishness in allowing me an excess of time and freedom to undertake and complete this research.

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The most significant personal contribution to this research has been made, albeit unknowingly, by the patients. I am grateful for the privilege I had of their spontaneous acceptance and affection which allowed my first experience of nursing research to be so personally enriching.

Alison J. Tierney
February, 1976.

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Chapter 1:

## INTRODUCTION TO THE RESEARCH

The research reported in this thesis is concerned with the subject of behaviour modification in mental deficiency nursing. The research consists of two studies. The first is an experimental study. It was undertaken to evaluate the effectiveness and practicability of the implementation, by nurses, of a behaviour modification toilet training programme. The programme involved a group of incontinent, low-grade mental defectives and was implemented in the patients' usual ward environment. The second study is a descriptive study. It concerned a survey of the involvement of nurses (working in mental deficiency hospitals in Scotland) in the application of behaviour modification techniques to mental defectives. The studies were undertaken between 1971 and 1974.

The research subject and the two specific studies within it were selected for a variety of reasons. These may be of interest to report. The researcher had recently completed general nurse training in combination with a social science degree through the Integrated Degree/Nursing Programme in the University of Edinburgh. This course had been found to be satisfying and stimulating. It had promoted an interest in the study of nursing, and had established a conviction that nursing practice and patient care could benefit from the application of theory and knowledge. Clinical experience, in a variety of areas, had given opportunity for the practical skills of nursing to be learned. However, such experience had been frustrating in revealing an enormous gap between theory and practice in nursing. The ideal situation and the actual situation seemed poles apart. Employment as a Staff Nurse in the general field did not seem to provide any immediate opportunity for further intellectual stimulation which was felt to be essential to sustain an interest in nursing and the study of nursing. The researcher's commitment to the development of higher education in nursing required an opportunity for the relevance of graduate nurses to the nursing profession to be tested. It was felt that research might provide such an opportunity. The most important desire was to undertake a clinical nursing study. Such research in nursing had been little developed in this country at that time, and seemed to hold most promise in directly influencing nursing practice. In addition, it was felt that the undertaking of a clinical study would permit the researcher to maintain contact with a clinical nursing area during the research experience.

Unlike other academic disciplines, study at post-graduate level is not a conventional step in the career of graduates in nursing. A problem existed in the absence of a particular

professional specialty and of depth of knowledge in a specific academic discipline. Although registered as a General Nurse, there appeared to be many potential constraints and conflicts in undertaking nursing research in the general field. The field of mental deficiency nursing presented an interesting and challenging proposition. A personal interest and curiosity in mental deficiency had been developed over a period of time. Mental deficiency nursing was an area which was considered to be a backwater of nursing. It contained many problems suitable for nursing investigation. At the same time, an academic interest in operant conditioning and behaviour modification had developed. There appeared to be a great deal of evidence to show that these techniques could be effective in training and rehabilitating mental defectives. One particular study influenced the selection of the research problem for the present research. This was reported by Levine and Elliott (1970) and concerned a behaviour modification toilet training programme. It was claimed that "one hundred and three profound retardates were toilet trained with limited staff in a ten-week program". A cursory review of related literature revealed other similar demonstrations of behaviour modification being effective in reducing incontinence and establishing toilet behaviour in mental defectives.

The demoralising and debilitating effects of incontinence on both patients and staff had been observed in a variety of clinical areas during training as a student nurse. Nurses appeared to accept incontinence as an inevitable and irrevocable condition of certain groups of patients. Nursing practice related to incontinence concentrated upon methods of dealing effectively and efficiently with its consequences. Measures were implemented to prevent some known complications of incontinence (such as pressure sores).

Little effort appeared to concentrate upon training and retraining patients to continence. That these general observations also pertained to mental deficiency nursing was highlighted in two contemporary reports which gained publicity. Within the report of a sociological study of mental deficiency institutions, Morris (1969) noted that "incontinence is said to be a major problem since it involves them (the nurses) in a great deal of work of a somewhat unpleasant nature." The report of the enquiry into allegations of maltreatment at the Ely Hospital (H.M.S.O., 1969) also contained specific mention of incontinence. It was noted: "Lax and old-fashioned standards of nursing care, reminiscent in too many ways of the old era of custodial care, have been accepted". It was particularly recommended that "methods of dealing with incontinence should be reviewed." The Chief Male Nurse had confirmed that the habit training of incontinent patients had never been attempted in that hospital.

The evidence of the effectiveness of behaviour modification toilet training of mental defectives appeared to provide a solution to the nursing problem of incontinence. It therefore seemed that to investigate the nursing implications of this evidence would constitute an appropriate subject for a nursing study within mental deficiency nursing. The most important implication was whether or not the toilet training procedures developed could be implemented in practice by nurses. It was clear that nurses saw it to be impossible to develop patient training to any extent within conditions prevailing in mental deficiency hospitals. Such features as large patient numbers, staff shortages, inadequacies of resources and the physical environment, and lack of time, were given by nurses as reasons mitigating against a therapeutic role in patient training.

The researcher was aware that such conditions existed. However, if patient training was to be increased in quality and quantity, training methods must be developed to be compatible with these. A major nursing problem is incontinence. Evidence is available to show the effectiveness of behaviour modification toilet training. A significant contribution of nursing research would be to test the relevance of this evidence to nursing practice. The aim of the study was defined as follows:-

> To evaluate the effectiveness and practicability of an experimental behaviour modification toilet training programme with a group of (low-grade) mental defectives in their usual ward environment, utilising the available complement of staff and existing resources, and minimising changes in the routine.

This study is an experimental study and provides the core of the present research. It is reported within Section II of the thesis.

It was hoped that a specific in-depth study of a particular aspect of the subject of behaviour modification in mental deficiency nursing would also provide indications of some general aspects of the subject. In addition, the use of experimental method within a nursing study was seen to provide an opportunity to comment upon methodology in nursing research and aspects of experimental nursing research in particular.

Having completed the experimental study, the researcher had become closely involved in developments of behaviour modification in mental deficiency nursing. Interest in, and application of, behaviour modification techniques had developed concurrent with the period of the main study. The Report of the Committee on Nursing (HMSO, 1972) contained recommendations for a new caring

profession to emerge in mental deficiency and for increasing emphasis to be placed by nurses upon patient training.

These recommendations could be seen to influence the development of behaviour modification in mental deficiency nursing. A major concern in this development has been related to the training of nurses in behaviour modification principles and techniques. The researcher was privileged to become a member of the Committee for Clinical Nursing Studies specialist panel, set up to develop a syllabus for post-registration nurse training in behaviour therapy. (C.C.N.S., 1974). Also, during 1975 the researcher was invited to give evidence on behaviour modification in mental deficiency nursing to the Government Committee established to develop ethical guidelines for professionals involved in behaviour modification activities (the Zangwill Committee). A further involvement has been as a member of the Behaviour Therapy Steering Committee of the Royal Edinburgh and Associated Hospitals. These various activities required the researcher to become conversant with developments of behaviour modification in mental deficiency nursing. Due to the time-lag involved in publication (and to the fact that nurses often do not publish reports of training programmes and small-scale studies), such information was difficult to obtain. It was therefore felt that information of nurse involvement in behaviour modification should be obtained. Such information could be useful in influencing trends in related nursing practice and specialist training during this period of development. In addition, it would provide a baseline against which progress could be evaluated in subsequent years. To this end, a descriptive study was undertaken. This involved a survey of all mental deficiency hospitals in Scotland in order to identify ongoing nurse-involvement in behaviour modification

activities. All activities reported in response to an initial postal questionnaire were studied by visits to the hospitals concerned. During the visits, activities were observed, information was gained about the activities, and nurses were interviewed about their involvement. The survey study is reported in Section III of the thesis.

A report of the first part of the experimental study was published in the nursing press in 1973 (Tierney, 1973). Following this publication, requests were made by nurses working with incontinent mental defectives for fuller details of the toilet training procedure to be made available. A three-part Tape/Slide sequence on Toilet Training (Tierney, 1975) has been completed recently in response to these requests.

Thus, the present research consists of two studies, one experimental and one descriptive. Together, these provide a specific and general viewpoint from which the research subject - behaviour modification in mental deficiency nursing - can be discussed in conclusion.

It is stressed that the present research constitutes a nursing study. It is concerned with mental deficiency nursing and, within that particular context, with behaviour modification as one approach within nursing practice. The principles and techniques of behaviour modification provide the theoretical, methodological and procedural framework for the research. However, the aims, results and discussion of the research are not concerned with behaviour modification per se but with its applications to nursing practice and its implications for the role of the nurse in mental deficiency.

Chapter 2.

## THE RESEARCH CONTEXT

There does not exist an extensive literature which relates specifically to the subject of behaviour modification in mental deficiency nursing. However, five areas of study can be identified as collectively providing the context of the present research. These are:-

1. Mental deficiency
2. Mental deficiency nursing
3. Research methods and nursing research
4. Behaviour modification in mental deficiency
5. Behaviour modification in mental deficiency nursing.

Figure 1 presents a diagrammatic representation of the research context. The five areas within it are arranged concentrically to indicate their proximity to the present research (which is represented by the central point of the diagram). The remainder of this Chapter concerns a review of the literature relevant to the areas within the research context.

### 1. Mental Deficiency:

Since the beginning of the twentieth century, many theories and concepts of mental deficiency have been developed. Tredgold (1908) took as the norm a 'normal', 'well-balanced', adaptable' and 'moderate' man (see Tredgold and Soddy, 1953). He regarded a lack of these survival qualities as a 'deficiency of the mind'. Doll (1941) explicated components of mental deficiency as (i) social incompetence; (ii) due to mental subnormality; (iii) which has been developmentally arrested; (iv) which obtains at maturity; (v) is of constitutional origin; and (vi) which is essentially incurable. The American Association on Mental Deficiency states

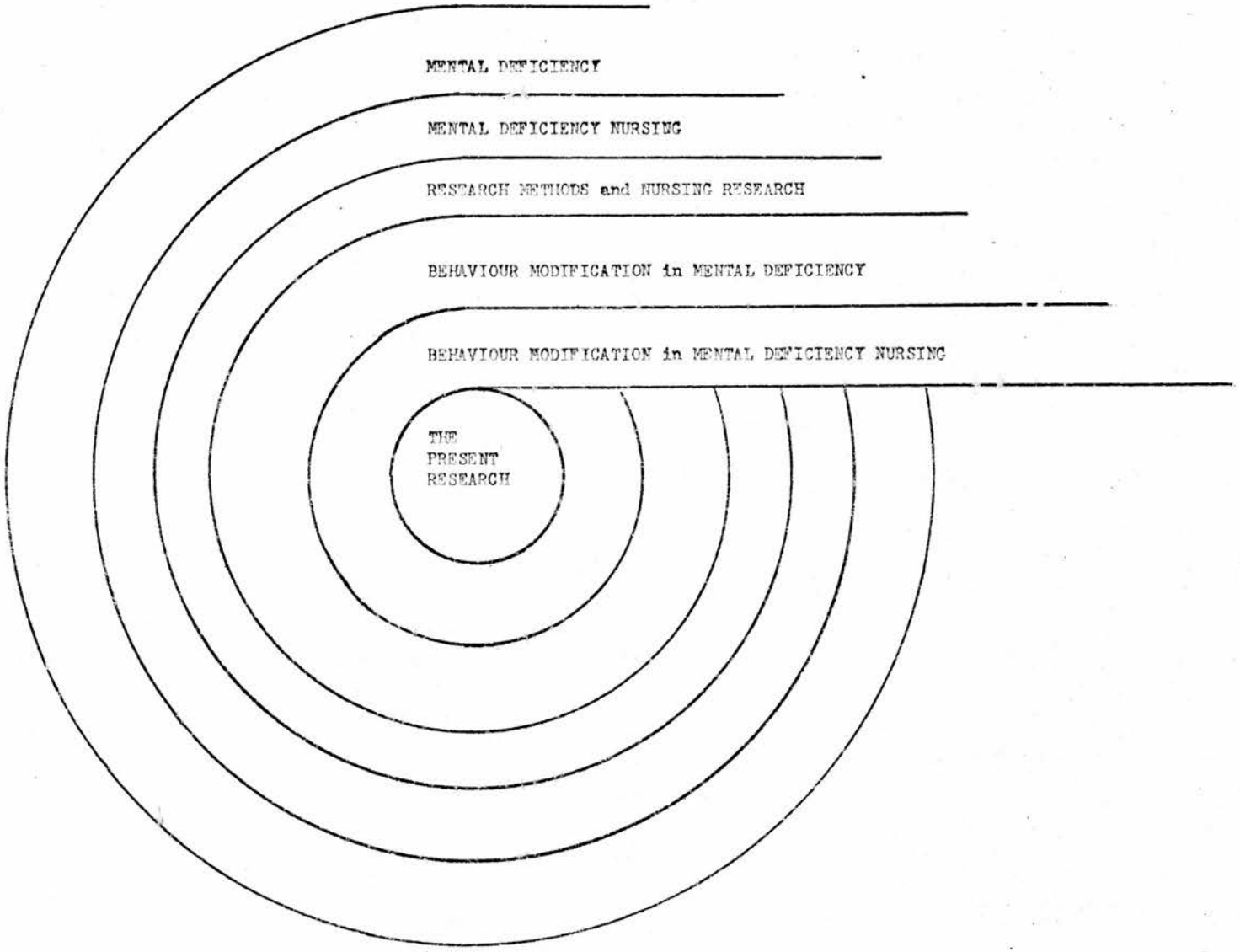



Figure 1 : The research Context.

that "mental retardation refers to subaverage general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behaviour." (Heber 1959). Referring to this definition, Heber comments that:

> " .... it is the impairment in social adaptation which calls attention to the individual and determines the need for social or legal action on his behalf as a mentally retarded person; it is the below average intellectual functioning which distinguishes mental retardation from other disorders of human efficiency."

Levels of intellectual functioning (or intelligence) are conventionally described in terms of an Intelligence Quotient (I.Q.) An I.Q. of 70 or below is indicative of mental deficiency; and that of above 70 of normal intelligence. The adoption of below-average intelligence as the predominant criterion of mental deficiency has been strongly criticised (see, for example: Clarke, 1958; and Leland, 1969). Such criticism derives from concern felt about an existing separation between methods of assessment and methods of evaluating outcomes of treatment (Mittler, 1973). The conceptualisation of mental retardation as "developmental retardation" (Bijou, 1963 and 1966) has provided a useful alternative approach in which methods of assessment and methods of treatment do not conflict. H.C. Gunzburg (see Gunzburg 1960, 1954a and 1973) in this country has promoted the concept of 'social incompetence' as the primary feature of mental deficiency. He adopts the definition of social competence provided by Kellmer-Pringle (1965):

> "Social competence is manifested by the extent to which an individual is able and willing to conform to the customs, habits and standards of behaviour prevailing in the society in which he lives; by the degree to which he is able to do so independently of direction and guidance; and by the extent to which he participates constructively in the affairs and conduct of his community."

In this thesis, the term 'mental deficiency' (and its derivatives) is adopted in keeping with statutory terminology used in Scotland. Mental deficiency is the term used in the appropriate register of the General Nursing Council for Scotland. Nurses who train in mental deficiency register as a Registered Nurse in Mental Deficiency (R.N.M.D.). Alternative terms to mental deficiency (mental subnormality, mental retardation, mental handicap) should be regarded as synonymous. Where reference is made to literature, the classificatory terminology adopted therein will be used. Changes in terminology reflect changing ideas and attitudes. A Government White Paper (Better Services for the Mentally Handicapped, 1971) maintains that the use of the term 'mental handicap', "helps to emphasise that our attitude should be the same as to other types of handicap; that is, to prevent it wherever possible, to assess it adequately where it occurs, and to do everything possible to alleviate its severity and compensate for its effects..." (p.1.) It is hoped that the use of the term mental deficiency does not imply that the philosophy of the White Paper is not accepted.

Prior to 1913 no statutory provision for the care of defectives was made except for their education in special schools by the Education (Scotland) Acts of 1906 and 1908. The report of a Royal Commission set up in 1904 to consider provisions for care resulted in the Mental Deficiency and Lunacy (Scotland) Act of 1913. This Act classified mental defectives as 'idiots', 'imbeciles' and 'feeble minded persons'. Idiots were described as those so deeply defective as to be unable to guard themselves from physical dangers. Mental defectiveness of lesser severity

was a feature of imbeciles. However, it was pronounced enough to prevent them from managing themselves or their affairs. Feeble minded persons, although still less defective, required care, supervision and control for their own protection or for that of others. Amendment of the 1913 Act ensued with the formation of the National Health Service. The N.H.S. (Scotland) Act of 1947 split the provision of services for mental defectives between hospital and local authorities. The Mental Health (Scotland) Act of 1960 replaced the 1913 Act. This 1960 Act abandoned the categorisation of mental deficiency; introduced the term 'mental disorder' to include both mental illness and mental deficiency; extended the functions of local health authorities; and enacted up-to-date legislation for care and treatment of mentally disordered persons, for their protection, and for safeguarding their property and affairs. Various classificatory terms are still widely used to describe degrees of mental deficiency, however. Figure 2 clarifies the equivalence of these various terms (after Kirman, 1968). For convenience, the terms low-, medium-, and high-grade defective are used within this thesis. These terms correspond to those original ones of idiot, imbecile and feeble-minded respectively and to the I.Q. ranges of 0-24, 25-49 and 50-70.

Mental deficiency is a symtom rather than a disorder. The aetiology of amentia is conventionally classified as (i) cases with known genetic abnormality and (ii) cases without known genetic abnormality, (Heaton-Ward, 1973). The first group of cases is attributable more directly to biological causes than to environmental causes; whereas, in the second group, the converse is true. Examples of mental deficiency due to a known genetic abnormality are

| General terms | Categories | I.Q. equivalent |
|---|---|---|
| Mildly mentally handicapped | High grade<br>Subnormal<br>Feeble-minded<br>Mentally handicapped<br>Moron<br>Debile<br>Mildly retarded<br>Educationally sub-normal | 50 - 70 |
| Mentally handicapped<br>Mentally retarded<br>Mentally defective<br>Mentally subnormal | | 25 - 49 |
| Severely mentally handicapped | Medium grade<br>Retarded<br>Imbecile<br>Trainable<br>Low grade<br>Profoundly retarded<br>Idiot<br>Untrainable | 0 - 24 |

Figure 2: Terms used in mental deficiency. (after Kirman, 1968)

Down's syndrome (chromosomal abnormality); microcephaly (genetic abnormality); and phenylketonuria (inborn error of metabolism). Causes of mental deficiency without known genetic abnormality include maternal infection during pregnancy (for example, virus rubella); childhood infection (such as encephalitis or meningitis); and brain damage due to anoxia or trauma.

The ascertained incidence (the prevalence) of mental deficiency varies between countries. The findings of surveys undertaken in this country (Susser and Kushlick, 1961; Kushlick, 1964; Scally and Mackay, 1964; Goodman and Tizard, 1962; Innes, Kidd and Ross, 1968) show that, whereas there is considerable variation in the ascertained incidence of high-grade deficiency, the prevalence of medium - and low-grade deficiency is consistent at approximately 3.7 per 1000 population. Lewis (1929), Kushlick (1964) and Goodman and Tizard (1962) all show mental deficiency to be more prevalent in rural areas than urban areas. Mental deficiency is slightly more prevalent in males than in females. Penrose (1972) attributes this to the wider distribution of intelligence about the mean in the male population. Birch, Richardson, Baird, Horobin and Illesley (1970) found a high prevalence of high-grade defectives within Social Class V. Since the early survey study of Lewis (1929), it appears that some forms of mental deficiency may be becoming more common as a result of improved neonatal care. For example, Goodman and Tizard (1962) confirm an increased prevalence of mongolism in comparison with that noted by Lewis. Leck (1966) notes the prevalence of Down's syndrome to be 1.6 per 1000 live births and thus this diagnosis accounts for 8.5% of the population of mental defectives.

More precise statistics are available regarding the hospitalised population of mental defectives. The total population of severely mentally handicapped individuals in England and Wales is estimated to

be about 120,000 (H.M.S.O., 1971). The 1970 Census of Mentally Handicapped Patients in Hospital in England and Wales (H.M.S.O.,1972) reports the total number of hospitalised mental defectives to be 57,771. This represents a slight decrease from 58,119 in 1954. The sex composition is 55% male and 45% female. In the 1954-70 period, the age composition has changed. For example, the number of males between 25 and 34 years fell by 22% and the number over 55 years rose by 210%, (O.H.E., 1973). In 1954, 9% of the hospital population was 55 years and over whereas, in 1970, this increased to 24%. Comparison of the 1954, 1963 and 1970 Census figures related to the degree of handicap of patients shows that the percentage of severely handicapped patients increased. Correspondingly, the percentage of mildly handicapped patients decreased. Between 1954 and 1963, the increase of severely handicapped patients was from 48% to 70%. The trend continued, but to a lesser extent, between 1963 and 1970. In 1970, 71.8% of the hospitalised population was classified as severely handicapped and 28.2% as mildly handicapped.

Statistics of trends within the hospitalised population of mental defectives are useful in planning provisions for custody. However, it is knowledge of the problems and needs of these patients which is essential for the planning of provisions for care and treatment. The 1970 Census provides useful information of the prevalence of incapacities associated with mental deficiency within the hospitalised population. A summary of relevant statistics is provided in Table 1 (Table 14; H.M.S.O. 1972).

It can be seen that the prevalence of incapacities of various kinds is high. Considering severe incapacities alone, 13% of patients were not ambulant; 20% were severely incontinent; 23% needed much assistance to feed, wash or dress; 16% had severe behaviour difficulties; 4% were blind and 3% deaf, or partly so; 21% did not speak; and 73% were illiterate. The prevelance of most of these incapacities fell as age increased.

Table 1 :
Prevalence of incapacities of mentally handicapped patients.

(Source : Table 14 in D.H.H.S. 1970 Census. H.M.S.O., 1972.)

| *Incapacity* | *Degree of mental handicap* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Severe and mild* | | | *Severe* | | | *Mild* | | |
| | *Persons* | *Children*[2] | *Adults*[3] | *Persons* | *Children*[2] | *Adults*[3] | *Persons* | *Children*[2] | *Adults*[3] |
| | *Per cent* | | | | | | | | |
| Non-ambulance | | | | | | | | | |
| Severe (non-ambulant) | 13 | 37 | 10 | 16 | 39 | 13 | 5 | 18 | 5 |
| Lesser degree (partially ambulant) | 9 | 10 | 9 | 10 | 10 | 10 | 7 | 7 | 7 |
| Ambulant | 78 | 53 | 81 | 74 | 51 | 77 | 88 | 75 | 88 |
| Incontinence | | | | | | | | | |
| Severe | 20 | 63 | 16 | 27 | 65 | 22 | 5 | 31 | 4 |
| Lesser degree | 10 | 13 | 10 | 12 | 13 | 12 | 6 | 13 | 6 |
| Continent | 70 | 24 | 74 | 61 | 22 | 66 | 89 | 50 | 90 |
| Needs assistance to feed, wash or dress | | | | | | | | | |
| Severe (much assistance) | 23 | 67 | 18 | 31 | 70 | 26 | 4 | 33 | 3 |
| Lesser degree (some assistance) | 19 | 21 | 19 | 23 | 21 | 23 | 10 | 25 | 10 |
| None | 58 | 12 | 63 | 46 | 9 | 51 | 86 | 42 | 87 |
| Behaviour difficulty | | | | | | | | | |
| Severe | 16 | 28 | 14 | 18 | 29 | 17 | 10 | 21 | 9 |
| Lesser degree | 16 | 16 | 17 | 16 | 15 | 16 | 19 | 29 | 19 |
| None | 68 | 56 | 69 | 66 | 56 | 67 | 71 | 50 | 72 |
| Defect of sight | | | | | | | | | |
| Severe (blind or almost) | 4 | 10 | 4 | 5 | 11 | 4 | 2 | 3 | 2 |
| Lesser degree (poor) | 12 | 13 | 11 | 11 | 13 | 11 | 12 | 7 | 12 |
| None | 84 | 77 | 85 | 84 | 76 | 85 | 86 | 90 | 86 |
| Defect of hearing | | | | | | | | | |
| Severe (deaf or almost) | 3 | 4 | 3 | 3 | 4 | 3 | 4 | 3 | 4 |
| Lesser degree (poor) | 8 | 8 | 8 | 8 | 9 | 8 | 7 | 3 | 7 |
| None | 89 | 88 | 89 | 89 | 87 | 89 | 89 | 94 | 89 |
| Defect of speech | | | | | | | | | |
| Severe (never spoke) | 21 | 60 | 18 | 28 | 62 | 24 | 6 | 29 | 6 |
| Lesser degree (odd words) | 21 | 25 | 20 | 27 | 26 | 27 | 8 | 22 | 8 |
| None | 58 | 15 | 62 | 45 | 12 | 49 | 86 | 49 | 86 |
| Illiteracy | | | | | | | | | |
| Severe (illiterate) | 73 | 95 | 71 | 89 | 98 | 88 | 38 | 71 | 37 |
| Lesser degree (partially literate) | 15 | 4 | 16 | 8 | 2 | 9 | 30 | 23 | 30 |
| None | 12 | 1 | 13 | 3 | * | 3 | 32 | 6 | 33 |

[1] Patients in hospital for less than one month at the time of the census are excluded.
[2] Aged under 15 years.
[3] 15 years and over.

The prevalence of each incapacity was considerably higher in the severely handicapped group than among the mildly handicapped.

Despite such statistics, some writers assert that hospitalisation is not as necessary as it might appear. Bone, Spain and Martin (1972) suggest that the majority of mental defectives can look after themselves adequately in basic self-care matters. Leck, Gordon and McKeown (1967) indicate that only a small minority of patients in fact require the skilled medical and nursing attention available only in hospitals. Their study involved all hospitalised mental defectives in the Birmingham area. Of the adult patients, 0.4% were found to require active hospital treatment; 47.4% required other forms of treatment; and 52.2% appeared not to require treatment at all. The general conclusion was that 50% of the patients did not need hospital care for either medical attention or nursing services.

In Services for the Mentally Handicapped (S.H.H.D. and S.E.D. 1972), reference is made to a follow-up study:McKeown and Tervel, 1970). Consultants were asked to assign patients, according to care required, to six classes:- investigation or active hospital treatment; mental and basic nursing; mental nursing; basic nursing; checking and counselling; and sheltered environment. This revealed that 30% required care of the last two classes only. A reduction in the number of hospital places was recommended.

Tizard, King and Raynes (1966) clearly highlighted the therapeutic advantages of community care and pointed out that institutionalisation may perpetuate the incapacities prevalent in the hospital population. Kushlick (see Kushlick, 1965 and 1970), in the Wessex region, is eminent amongst those who have propagated and developed the concept of residential care in the community for mental defectives.

Provisions made for mental defectives include a wide range of professional, administrative and voluntary services. These operate

in hospitals and in the community. The available services are described by O.H.E. (1973) and Ritson (1973). They include (i) hospital facilities with various therapy departments, assessment services and treatment provisions (medical, psychiatric, nursing and psychological); (ii) social services; (iii) educational facilities; and (iv) residential care facilities.

In recent years, there has been considerable debate about the provision of services in mental deficiency. Pilkington (1974) notes that a consequence of this debate is the polarisation between "the traditionalists promoting the development of services from a revised and more multidisciplinary but psychiatric medico-nursing standpoint with more community involvement ... and the more radical reformers operating from an educational or social work focus orientated within the community itself ..". Of the two groups, it is the "traditionalists" who have been the subject of recent attack and criticism on account of the institutions they represent.

The era of institutional care of mental defectives barely spans a hundred years in this country. By all accounts, it must be accepted that improvements in the standards and outcomes of care have been achieved. However, never has the demand for further improvement and radical change been so loudly voiced as in the past five years. Tizard (1972), in noting that "people are no longer prepared to tolerate what seemed appropriate and inevitable only a few years ago", may well have been summarising the change in attitude which has taken place since the frank findings of Morris (1969). Townsend, in the forward to this comprehensive sociological study of mental deficiency institutions, comments:

> ". Because almost everyone .. regards the poor conditions of these (mental deficiency) hospitals with comparative equanimity and because almost everyone adopts an attitude of untutored pessimism about the possibilities of educating and occupying the handicapped, unjustifiably low standards of care are tolerated. The hospitals have been gripped

> with a kind of creeping organisational sickness, within which the handicapped have little chance to fulfill themselves or enjoy the rights available to other citizens. This is the tragic problem we must try to understand and to solve ..."

That tolerance and equanimity have been displaced by appraisal and activity is seen in a variety of developments. Voluntary organisations, parents' associations, journalists and the mass media have become active in publicising shortcomings of the service, in creating greater public awareness of mental deficiency, and in lobbying for improvements and changes in attitude. Professions which contribute to mental deficiency have undertaken reappraisal of their role, function and training. Pilkington (1973), Godber (1973) and Fraser (1974) have added to the critical discussion in medicine of whether or not mental deficiency should be regarded as a specialty. In a reappraisal of the role of the clinical psychologist, Clark (1968), proposes an extension of the conventional assessment function to include advising on training and rehabilitation programmes, the application of behaviour therapy techniques, and research and teaching. The Batchelor Report (1970), the Briggs Report (1972) and various authors have influenced discussion on the role of the nurse. Recognition by these main professions (and many others) of the need for interdisciplinary co-operation was signified by the establishment of the Association of Professions for the Mentally Handicapped in 1973 (see A.P.M.H., 1974).

The Government has responded to professional and public debate and the publication of a White Paper in 1971 (Better Services for the Mentally Handicapped: Services for the Mentally Handicapped, 1972 is the corresponding paper pertaining to Scotland) acknowledged the shortcomings of both the quantity and quality of present services. A shift in the balance from hospital to community care, with rapid expansion in local authority services, was proposed. With the

resulting reduction in the number of mentally handicapped individuals cared for in hospital, there would require to be closer links between hospital and community services, and a commitment to improve both.

Achievements and progress have been noticeable since the publication of the White Paper, particularly in relation to improvements in the physical environment of institutions. However, the need for continuing inquiry and solution was announced by the Secretary of State in February 1975, (DHHS , 1975). Four specific policy developments were announced:- (i) to set up a National Development Group for the Mentally Handicapped to advise on policy and the strategy for its implementation; (ii) to establish a Development Team to implement policy according to the recommendations of the Group; (iii) to establish an enquiry into mental handicap nursing and care (to be chaired by Mrs Peggy Jay); (iv) to continue with consultations in progress concerning the role of the medical specialist in mental handicap.

This announcement might be regarded as the culmination of the intense debate and enquiry which have surrounded mental deficiency during the period of this research. It must be hoped that it is not only the culmination of debate but also the precedent of action.

## 2. Mental deficiency nursing:

The establishment of the committee of enquiry into mental handicap nursing and care (The Jay Committee) is the most recent development within mental deficiency nursing. The terms of reference are:

> "To consider recommendation 74 of the Report of the Committee on Nursing (Briggs Committee), in particular to enquire into the nursing and care of the mentally handicapped in the light of developing policies, to examine the roles and aims of nurses and residential care staff required by the health and personal social social services for the care of mentally handicapped

> adults and children; the inter-relationship between them and other health and personal social services staff; how existing staff can best fulfill these roles and aims; in the interest of making the best use of available skills and experience, the possibilities of the career movement of staff from one sector or category to another; the implications for recruitment and training; and to make recommendations."

In October 1975 letters inviting evidence to be submitted to the Committee were circulated to institutions and individuals. The evidence will be considered in the spring of 1976. The recommendations of the Committee will no doubt provide clarification on at least some of the unresolved issues which surround the future of mental deficiency nursing.

It is the recommendations of the Briggs Report (The Report of the Committee on Nursing: 1972) that have precipitated a major debate concerning mental deficiency nursing. Recommendation 74 states:

> "A new caring profession for the mentally handicapped should emerge gradually. In the meantime, in the training of nurses in the field of mental handicap, increased emphasis should be placed on the social aspects of care."

(The full recommendations are contained in Paras. 557 - 565 of the Report). The Report identifies services of three kinds to which nurses presently make a significant contribution. These are (a) therapeutic services (for physical illness or disability or psychiatric disorder); (b) education, and occupational and social training; and (c) 'home' (or 'parental') care. It is noted that only those mental defectives for whom 'therapeutic' needs are predominant will be cared for in hospital ultimately. It is implied that nurses are meeting the needs of this group of patients satisfactorily and that they should continue to undertake this function. In recognising that such patients also require social development and parental care, it is recommended that the education

of nurses in mental handicap should develop an emphasis on the social as well as the physical aspects of care. It is in relation to the needs of the majority of the population of mental defectives (those requiring care in which social, occupation and educational training predominate) that the Report recommends the evolution of a new profession ("care staff"). This profession, now generally described as 'the new caring profession', would ultimately become community-based. In the meantime, the care staff would have a role as a residential staff working alongside nurses in the hospital context.

The Report notes that the introduction of an additional profession might result in friction with the existing nursing profession; and that, in some instances, nurses are already providing the wider role envisaged of the new care staff. It is suggested that the new profession need not exclude nurses and that the proposed Higher Certificate Level in nurse education might equip some nurses to become the leaders of it.

Hegarty and Sutherland (1973), in the nursing contribution to a multidisciplinary analysis of New Perspectives in Mental Handicap, typically adopt a post-Briggs' questioning of the validity of the traditional role of the mental deficiency nurse. They note that "the traditional nursing approach to care has become relevant for a decreasing number of patients," and conclude that "fresh consideration of existing training" is required. Only two years prior to the Briggs Report, the Batchelor Report (The Staffing of Mental Deficiency Hospitals, 1970) had questioned the concept of mental deficiency nursing. Several recommendations of the Report pertain to nursing and these are noted below:-

a. As many of the population of the hospitals do not require nursing there should be a radical reappraisal of mental deficiency nursing.

b. The type of nursing care required by mentally deficient patients varies greatly and no technique of nursing peculiar to this field can be identified.

c. Mental nurses should be accepted as fit to nurse in mental deficiency hospitals without further training or experience and the present distinction between mental and mental deficiency nursing should be abolished.

In assessing nursing care, Leck, Gordon and McKeown (1967) attempted to distinguish between 'skilled' and 'basic' nursing. The distinction was not found to be useful because so few patients required skilled physical care. It was concluded that about 30% of patients studied needed basic nursing and about 60% required no nursing services at all.

A survey carried out in two Scottish mental deficiency hospitals is described in Services for the Mentally Handicapped (SHHD and SED, 1972). A finding of the survey was that only 46% of adults in one hospital needed physical and/or mental nursing. 64% in the other hospital had similar requirements. The remaining 54% and 36% of patients respectively required 'supervision' only.

These two studies support the general comment of the Batchelor report that "many of the population of the hospitals do not require nursing".

The Briggs Report perhaps has been most responsible for the current appraisal of the mental deficiency nursing profession. However, it requires to be said that some nurses voiced opinions about their profession even before these recent developments. O'Hara (1968) asserted that nurses should adopt a wider educational role:-

> "The time formerly spent on nurse training could be used to absorb teaching techniques; we could move from the role of nurse to that of teacher; not as a teacher in the three 'R's' sense but as developers of latent abilities."

Rogers (1971) described the adverse effect on nurses' job satisfaction of the introduction of various specialist professions into mental deficiency. A recent development of this kind has created further concern amongst nurses. This refers to the assumption of total responsibility by local education authorities for the education of all mental defectives (see S.E.D., 1973).

It is difficult to present an accurate summary of the current views within the mental deficiency nursing profession which relate to developments within mental deficiency services and recommendations specific to the nursing contribution . These are wide-ranging and without concensus; many of the views presented in written form have appeared in the Letters' pages of the weekly nursing press.

Some nurses see the recommendations of the Briggs Report to imply denigration of past achievements, to propose a dimunition of responsibility and to threaten career prospects and professional identity, (see for example; Haygarth 1973). Others refute the need for a new profession, arguing that nurses can, and do, fulfill the wider social needs of the patients (see: O'Toole, 1972; Pennell, 1973; Stokes, 1973). Another viewpoint is a positive acceptance of the recommendations in the recognition that nurses can make a major contribution to the new profession envisaged (see: Day, 1973). It is apparent that some concern has arisen due to a misunderstanding that nurses in the field would be replaced rather than supplemented. Gorman (1972) clarifies this point, in saying, "Nurses will not therefore be replaced but will form the nucleus of a new caring profession". Thomas (1973) presents a forceful argument in favour of the Briggs'

recommendations and sees them to be compatible with the future of the present nursing profession and policy developments in the mental deficiency field. He states that "the 'core' skills and knowledge" required in mental deficiency care are not those that are central to nursing; that"the committee ... saw a unified caring profession as facilitating the successful implementations of the dual system outlined in Better Services" (H.M.S.O. 1971); and that the emergence of a new caring profession" ... presents the nurses in this field with a unique opportunity to have a say in their own future and to influence and shape the development of a unified service."

While the Briggs Report awaits Government approval and the Jay Committee commences further examination of the role of the nurse, no radical changes in practice and training can be undertaken. Concrete suggestions as to how training of the new profession might develop are contained in a King's Fund Centre discussion paper (1973). A New Syllabus is proposed, this being an amalgam of the G.N.C. Syllabus for the Training of the Subnormality Nurse and the C.C.E.T.S.W. Pattern for Training for the Residential Social Worker. There was some support for this proposal at a conference of senior nurses (Elliott, 1974) in which it was agreed that " ... the nature of the training needs to be changed and that it ought to be developed in parallel with training for residential social workers, and to some extent with training in special education."

For the time being, however, the present training of nurses in mental deficiency remains under the statutory control of the G.N.C. Training for registration involves a 3 -- year programme which is based on the G.N.C. syllabus (England and Wales; and Scotland). In Scotland, on completion of training, nurses register as Registered Nurses in Mental Deficiency (R.N.M.D.). In England

the equivalent qualification is R.N.M.S. (Registered Nurse for the Mentally Subnormal). Trained nurses at present are employed almost exclusively in mental deficiency hospitals.

H.M.S.O. (1971) contains some information on staffing. In mental deficiency hospitals in England and Wales the number of nurses (whole-time equivalents) has risen from 10,000 in 1959 to 14,600 in 1969. However, it is said: "... These numbers are still insufficient to allow nurses to care properly for mentally handicapped patients, to give all patients the personal interest and social stimulation they require and to relieve the nurses of domestic work." The nurse: patient ratio is noted to have been ascertained in 1965-66 to vary between 1:10 - 1:34 in adult hospitals and 1:6 - 1:16 in childrens' hospitals.

The Batchelor Report (1970) noted wide-spread shortages in various categories of staff. The number of nursing staff per 100 patients was found to be 16.5. for trained (and in-training) nurses, and 11.29 for untrained nurses. This compares, for example, with 0.74 medical staff and 0.7 psychologists per 100 patients.

The mental deficiency nursing profession has been subjected to criticism in recent years and some of its failures have been explicated by Morris (1969) and the Howe Report (1969), the Briggs Report (1972) and the South Ockendon Report (1974). Many nurses themselves acknowledge that the criticisms of failure, perpetuation of custodial care and absence of therapeutic advances are justified. Some of the shortcomings of nurses must be at least partially excused due to problems which prevail in their working situation. There is shortage of staff, lack of facilities, over-crowding of wards and inadequate staff training. Even despite such disadvantages, nurses in some situations have been able to provide

high standards of care and to develop a therapeutic aspect to care. It would appear that it goes unchallenged that nurses have the potential to provide a significant contribution to mental deficiency services. Forrest (1972) appraises the nurse's role in the hospital service and concludes that " ... there is ... plenty of work for the nurse in the field of mental handicap." Hegarty and Sutherland (1973) identify and discuss the skills of mental deficiency nursing within the framework of mental health nursing practice in general (after John, Leite-Ribeira and Buckle, 1963). The skills identified are 'basic nursing skills'; 'technical nursing skills'; 'occupational, recreational, social skills'; 'organisational skills'; 'observational skills'; and 'skills of communication.' The application of these skills to nursing mental defectives both in hospital and in the community is outlined, showing the possibility of a positive and effective nursing role.

This time of reappraisal is a critical one for the mental deficiency nursing profession. Gunzburg (1975) offers a relevant comment concerning the objectives and outcomes of such professional change:

> "If the present time is to be a turning point in the history of dealing with the problems of Mental Retardation then this will not be done by ... administrative changes .. which ... despite their revolutionary appearance simply disguise the fact that old attitudes and practices persist under new management and without giving any fundamental benefits to the mentally retarded, except that more money is spent on his care. If, on the other hand, these changes take place because the conditions have to be altered in order to enable an integrated profession to devote attention to the development of the mentally retarded, rather than to work out the professions' mutual relationships and respective territories, then we shall have indeed achieved a significant and relevant turning point."

## 3. Research methods and nursing research:

Research, in its broadest sense, is an attempt to increase knowledge and to gain solutions to problems. It involves the rigorous collection of data from the purpose of description, explanation or prediction. 'Scientific method' is a term used to describe research in order to distinguish it from the concept of problem - solving (Polta and Deck, 1966). The unique features of research are objectivitity and the use of empirical data in a systamatic manner. Scientific method derives from the physical sciences. There have therefore been a number of conflicts in the adaptations of scientific method to the study of human behaviour. Goode and Hatt (1952) cite these conflicts to include (i) that behaviour changes over time and thus exact predictions are prevented; (ii) that individual behaviour is too complex to be subjected to quantitative analysis; (iii) study of humans by humans inevitably involves bias; (iv) that the free will of humans allows them to manipulate variables and thus confound predictions. Goode and Hatt (1952), Sellitz, Jahoda, Deutsch and Cook (1960) and Madge (1965) provide accounts of research methods relevant to the study of behavioural and social sciences.

Sellitz et al. (1960) show that the research method is selected in relation to the purpose of a study. The purpose may be (i) to gain familiarity with a phenomenon or to gain new insights into it, often in order to formulate a more precise research problem or to develop hypotheses; (ii) to portray accurately the characteristics of a particular individual, situation or group (with or without a specific hypothesis ); (iii) to determine the frequency with which an event occurs or its association to another event; (iv) to test a hypothesis of a casual relationship between

variables. Studies with the first purpose are described as exploratory (or formulative) studies; those with the second or third purpose are called descriptive studies; and those with the fourth are classified as experimental studies. The major distinction in methodology is between descriptive and experimental studies.

Descriptive studies can employ a variety of research methods. These include observational method (participant or non-participant; structured or unstructured; continuous or intermittent), survey method, interview method, questionnaire and analysis of records. Each method has the objective of describing phenomena or describing causal relationships between phenomena.

Experimental method derives from the classic experimental design and has the objective of testing the causal relationship between the dependent variable(s) and the manipulated independent variable (the experimental influence).

In research, theory and method are closely related. Theory serves to provide a specific conceptual framework in which the relevant phenomena are systematised, classified and interrelated. The theory selected defines the major orientation of study, allows the data gained to be summarised into empirical generalisations and directs predictions. Reciprocally, facts (data gained) are productive of theory. (Goode and Hatt, 1952).

The absence of an explicit theory of nursing therefore poses a fundamental problem for research in nursing. In addition, nursing research methodology inherits the weaknesses of research methods in the behavioural sciences. Nursing research is defined by Abdellah and Levine (1965) as:

" A systematic, detailed attempt to discover or confirm

> facts that relate to a specific problem or problems in the field of nursing. It has as its goal the provision of scientific knowledge in nursing."

The difficulty in identifying nursing theory can be attributed to the many various specialties included in nursing and to the fact that nursing is an applied discipline. As Davies (1973) comments, " ... It is not uncommon for an applied discipline to draw concepts from the purely academic disciplines such as biology, social and physical sciences. Conceptual framework(s) useful in nursing, can come from any scientific discipline and what becomes an appropriate conceptual framework depends on the nature of the research which is undertaken."

Scott Wright (1971), Simpson (1971) and Hockey (1974) provide comprehensive reviews of the current state of nursing research in this country. Simpson notes that despite the evidence to show that reforms of Florence Nightingale were firmly based on "meticulous investigation", " ... a research approach to problems was however never transmitted as part of the Nightingale tradition." John (1961), Norton (in Exton-Smith, Norton and McLaren, 1962), Hector (1966), Hockey (1966, 1968), Macguire (1966) and Raphael (1969), are examples of nursing studies undertaken during the first major period of redevelopment of research in this country. The reviews of this period concur that some significant problems confront nursing research. There is, in general, a paucity of research. Even in areas where relatively numerous studies have been done (for example, in relation to nurse recruitment and wastage: Simpson, 1971), research is not interrelated or replicated. It is suggested that the lack of operational implications of research to date is due to the reliance upon descriptive research method; and the need for developing experimental research in nursing is agreed. Methodological problems include the absence of a theory of nursing and thus

reliance on the adaptation of theoretical frameworks from other disciplines. The availability of suitable evaluative tools for nursing research is limited as is the availability of suitably qualified nurses (clinically and academically) to undertake the required research.

The Briggs Report (1972) clearly acknowledges the importance and necessity of research in nursing. The Report recommends that "nursing should become a research-based profession ... a sense of the need for research should become a part of the mental equipment of every practising nurse or midwife." In particular, the necessity for research-based education, clinical nursing research, research undertaken by nurses themselves, and innovation in nursing practice through research, is noted. (Paragraphs 370 - 378 inclusive).

Some twelve years earlier, Brotherston (1960) commented that: "Whereas the ability and opportunity to carry out research must be limited to a minority in any profession, an urgent and understanding sense of the need for research should be part of the mental equipment of any profession worthy of the name." And, even earlier, Merton (1958) asserted that:

> "A profession not rooted in systematic knowledge is a self-contradiction, a myth rather than reality ... the provision of research personnel and resources is one of the great requirements of a profession ... the silent revolutions in all professions have come as a result primarily of knowledge enlarged through research."

Indications of progress in nursing research during the first part of the present decade can be seen in various developments. As the growth of nursing within universities continuesthere is, increasingly, research being undertaken by academic staff and post-graduate students. A Nursing Research Unit was established in the University of Edinburgh in 1971, allowing the

development of a coherent and continuing programme of nursing research. This Unit, other research centres and the Royal College of Nursing have been expanding the number and type of research courses for members of the nursing profession. Throughout the country, nursing research discussion groups have been established. Appointments of nursing research officers have been made at Government, Area and Regional levels to encourage the iniation, support and co-ordination of research activities. The effectiveness of such developments is reflected in the rapidly increasing number of studies being undertaken and reported.

A major contribution to the development of clinical nursing research is provided by the Studies within a Rcn project to develop measures of the quality of nursing care. The project is introduced by McFarlane (1970) and concluded by Inman (1975). The twelve studies undertaken (Stockwell, 1972; Hamilton Smith, 1972; Anderson, 1973; LeLean, 1973; Munday, 1973; Franklin, 1974; Hawthorn, 1974; Hunt, 1974; Wright, 1974; Hayward, 1975; Jones, 1975; Roberts, 1975) focus on specific aspects of nursing care. All, except one (Roberts), are ward-based. Various research methods and evaluative tools were employed. Only one study (Hayward, 1975) was based on experimental design. This aimed to test the hypothesis that giving relevant pre-operative information to patients would reduce post-operative pain and anxiety. The efficiency of a topic-centred information schedule was tested with matched groups of patients (n = 134) using various measures. The experimental hypothesis was upheld for total samples in both hospitals used and for one of two sub-groups in the second hospital. Hayward noted that the results demonstrated the feasibility of ward-based experimental research in nursing.

The greater progress and experience in clinical research within the U.S.A. and Canada must also be seen as a valuable resource. These countries have done much to promote conceptualisation in nursing (See: Mitchell, 1973) and to develop a conceptual framework for nursing research. It is interesting that, despite the quantity of research undertaken (see reviews of Roberts, 1954; Simmons and Henderson, 1964; Abdellah, 1970) and the emphasis on clinical research, the National Commission for the Study of Nursing and Nursing Education (1970) reported:

> "It is regrettable that so little research has been conducted to determine the relative effectiveness of various forms of nursing intervention and the impact of particular innovations in nursing practice."

Similar comment is also made by Henderson (1956) and Werley (1972).

Diers (1972) provides an interesting classification of the types of clinical nursing research according to a hierarchy of proximity to actual practice. From bottom to top of the hierarchical construction are (i) studies to solve problems in practice; (ii) studies to solve practical problems and to contribute to knowledge; (iii) clinical studies (which attempt to relate the study to others and to theory but do not make particular effort to solve practical problems); and (iv) studies of scientific curiosity (greatest concern is with issues of theory, method and analysis). Diers shows that, as one moves up the scale, "the so-called scientific value increases, but the potential for influencing practice decreases. As one moves down the hierarchy, the relation to practice increases at the expense of contribution to knowledge."
Diers concludes that studies of the third type are most numerous; that studies within the first category tend not to be published; and that the greatest need is for studies of the second type.

The dual purpose of such studies is described aptly by Schlotfeldt (1960):-

> "The primary task of nursing research is the development and refinement of nursing theories which serve as guides to nursing practice and which can be organized as a body of scientific nursing knowledge. A concomitant task of nursing research is the discovery and development of valid means of measuring the extent to which nursing action attains its goal - these to be measured in terms of patient behaviours."

Major contributions to the development of research methodology peculiar to nursing research also originate in North America (Heidgerken, 1959; Meyer and Heidgerken, 1962; Abdellah and Levine, 1965; Treece and Treece, 1973).

There is no large scale nursing study reported in the (U.K.) nursing literature which pertains to mental deficiency nursing. A study undertaken to examine the pattern of nursing workload in one hospital is reported by Gault (1973). Its purpose and results are noted.

The primary objectives were to investigate the relationship between patient characteristics and workload at ward level and to identify criteria to assess the effects of varying staff levels. Nursing duties were classified as (i) related to basic physical demands of patients; (ii) socio- and psycho-therapeutic; (iii) other (e.g. administrative.) Six wards were studied and observations made of nurses yielded data concerning the nature of nursing duties undertaken. A model developed showed the amount of basic nursing performed in a ward is determined to a large extent by the long-term (rather than short-term) staff level of that ward. It was not possible to identify relationships between patient characteristics and nursing workload. It was hypothesised from results of observations that socio- and psycho-therapeutic nursing may have an upper limit which is determined not just by patient characteristics but also by staff attitudes. Gault comments:-

> "If objectives include more provision of psychotherapeutic nursing then the employment of extra nursing staff alone is not the answer. There must simultaneously be adequate direction of management to inculcate desired attitudes and to to reorientate the nurses ...."

Little investigation has been carried out by nurses in relation to the problem of incontinence and related nursing care. Nursing textbooks seldom refer to studies of aspects of incontinence undertaken within other disciplines. The relevant physical, social and psychological factors are usually acknowledged and the nursing procedure required when a bed-fast patient is incontinent is described (see, for example: Roper, 1973). The research of Reid (1975) contributes knowledge about the nursing management of ambulant patients who are incontinent. Her identification of the lack of nurse training and environmental constraints related to this aspect of management may help to encourage improvements in practice and hospital planning. The use of appliances and special clothing for incontinent patients has been the subject of some nursing study. Elphinck (1970) describes some of the protective garments and appliances available to alleviate the consequences of unavoidable incontinence. Henderson and Rogers (1971) report the outcome of a trial of different incontinence pads for use in hospitals. Lowthian (1973) discusses methods of bed protection for enuretic people living at home. The relationship of incontinence with the development of pressure sores (incontinence being a predisposing factor) has received attention in nursing research concerned with the problem of pressure sores. Norton (in Exton-Smith ,Norton and McLaren, 1962), a nurse, contributed to early research in this field within an investigation of geriatric nursing problems in hospital.

One area of investigation (which relates closely to the

experimental study of the present research) into incontinence has been almost totally neglected by nurses. This refers to studies carried out to develop nursing methods of training and retraining patients to continence. Hardy (1971), reporting on a conference about incontinence in the elderly, details a retraining programme in one geriatric long-stay ward. She comments that "the striking reduction in incontinence showed that, if the problem was not accepted, but tackled with enthusiasm and hard work, it could be prevented." Wells (1975) has recently completed a nursing research programme within geriatric nursing. She notes that: "Not only is there a tendency to accept incontinence but ward staff are frequently satisfied with their methods of dealing with it." She describes a series of environmental and physiological factors to promote urinary continence in the elderly in hospitals. Long-stay psychiatric wards also frequently contain patients who are incontinent. This was the setting of a short-term project concerned to reduce nocturnal enuresis (Hartie and Black, 1975). The project involved a positive reinforcement procedure based loosely on operant conditioning principles. The report is the only nursing publication discovered in the literature which concerns the application of behaviour modification techniques to toilet training. Five patients (aged 58 - 70 years) were assigned to the programme and, during a two-month intervention period, a toileting schedule and positive reinforcement of a dry bed were introduced. An overall decrease of 48.96% in the frequency of episodes of enuresis was achieved; and the frequency of dry nights was increased by 80%. The authors conclude that:

> " ... the value of this study has been to show that a systematised, simple approach to the problem of nocturnal enuresis has substantially reduced the

> frequency of incontinence episodes. This not only has direct benefits for the patient but there are also subtle indirect benefits to be gained from the undoubted improvements in the nurse-patient relationship."

4. Behaviour modification in mental deficiency:

Since the classic study of Fuller (1949), there has been a tremendous increase in the amount of clinical and research work in mental deficiency concerned with the application of behaviour modification principles and techniques. This development occured earlier in the U.S.A. and has been emulated in this country in recent years.

Ullman and Krasner (1965) state:

> "The basis of behavior modification is a body of experimental work dealing with the relationship between changes in the environment and changes in the subject's responses." Further, in a treatment programme employing the operant conditioning model, "the subject is exposed to an environment which is manipulated by the therapist to provide meaningful contingencies for the subject's differential response to stimuli."

The theoretical framework of behaviour modification is rooted in the operant conditioning model of Skinner and other experimental psychologists (for example: Skinner, 1938 and 1953; Ferster and Skinner, 1957). In this thesis, the term 'behaviour modification' is used to describe principles and techniques which are developed directly from the operant conditioning model. Watson (1962) and Gardner (1971) are among those to use the term more widely within which various behavioural techniques are accomodated: (for example, behaviour therapy). Keehn and Webster (1969) note that "there does not seem to be a clear differentiation in the literature between the group of procedures collectively known as behaviour therapy and the operant conditioning methods by which behaviour modification

is achieved." Eysenck (1959) introduced the term behaviour therapy "to contrast them (behaviour therapy methods) with methods of psychotherapy." Behaviour therapy is interpreted to derive from various theories of learning (including the classical conditioning model - Pavlov, 1928); whereas behaviour modification to derive from the operant conditioning model only. Behaviour therapy more commonly applies to psychiatry whereas behaviour modification applies to mental deficiency. (see Shaeffer and Martin, 1975).

It is inherent in the radical behaviourist position represented by behaviour modification that mental deficiency is viewed essentialy as a deficiency of learned behaviour. Thus, mental deficiency is considered to be developmental rather than psychological/intellectual retardation (Bijou and Baer, 1961; Bijou, 1968).

The concept of reinforcement is central to behaviour modification. Reinforcement can be positive or negative. Any stimulus event is by definition a positive reinforcer if, when presented following a response, it increases the frequency (or strength) of that response. The strength of behaviour is measured in terms of response rate or frequency. The presentation of positive reinforcement therefore increases response frequency. The effectiveness of positive reinforcement is determined by several factors. These include the immediacy of presentation, the reinforcing properties of the stimulus for the subject, the state of deprivation or satiation of the subject, the type of response and the schedule of reinforcement (continuous or intermittent). Response frequency can also be increased by negative reinforcement. This involves the removal of an aversive stimulus following the response.

Just as there are two basic procedures for increasing response frequency (positive and negative reinforcement), there are two

procedures for decreasing the strength or frequency of the response. These are extinction and punishment. Extinction involves the removal of contingent stimulus conditions which are maintaining the response (the removal of positive reinforcement which follows the response). Punishment involves the presentation of an aversive stimulus following the response to be eliminated.

Behaviour modification techniques are based on these procedures. Appropriate behaviours can be strengthened (and established) through the use of positive and negative reinforcement procedures. Such behaviour modification techniques are known as shaping (or successive approximation), forward and backward chaining, prompt and fade, imitation and modelling. Inappropriate behaviours can be weakened (and eliminated) through the use of extinction and punishment techniques. Time-out is a particular term to describe an extinction technique.

Gardner (1971), Bandura (1969) and Agras (1972) provide detailed description and discussion of the concepts of operant conditioning and the techniques subsumed under the heading of behaviour modification.

Thus, in mental deficiency, behaviour modification can be applied for two main purposes. Firstly, where behaviour deficits and incapacities are present, positive and negative reinforcement techniques can be employed to establish and strengthen appropriate behaviours. Secondly, where behaviour problems exist, extinction and punishment techniques can be applied to eliminate the inappropriate behaviours.

As noted, the amount of work carried out in recent years has been extensive. It is interesting to note that Grossberg (1964) cited only one case study in mental deficiency within a review of

applications of behaviour therapy. The changed situation now prohibits the inclusion here of a comprehensive review of the extensive literature. Reviews and bibliographies are available in Spradlin and Giradeau (1966), Ellis (1966 - 1970), Gardner and Watson (1969), Baumeister (1967), MacKay (1969), Nawas and Braun (1970) and Gardner (1971).

Applications of behaviour modification to the moderately and mildly retarded have concentrated on education, socialisation, occupation and rehabilitation. In relation to the severely and profoundly retarded, however, the emphasis has been that of developing basic self-help skills, (Gardner 1971). Techniques to establish and strengthen behaviours have been predominantly employed in this respect. There has, however, been a significant amount of work undertaken using techniques to eliminate inappropriate behaviours (such as, self-mutilating responses and excessive vomiting). Most studies of this type include concurrent reinforcement procedures to establish appropriate behaviour. An example of successful elimination of excessive vomiting and disruptive behaviour using extinction is that of Wolf, Risley and Mees (1964). Hamilton and Stephens (1968) employed time-out to eliminate disruptive behaviour of a disturbed, retarded adolescent to allow a speech training programme to be introduced without disturbance. Punishment techniques have been used in various studies reported. Tate and Baroff (1966) describe the effectiveness of response contingent electric shock for a young blind patient who engaged in various self-destructive behaviours. The use of punishment techniques has aroused much theoretical and emotional debate and it is not relevant to detail this here. A recently developed method, not dependent upon punishment of eliminating inappropriate behaviour, relies upon the reinforcement of competing behaviours (D.R.O.). Peterson and Peterson (1968) provide an illustration of the success of

this method in the control of self-destructive behaviour of a retarded boy.

The experimental study of the present research is directly concerned with the use of non-aversive behaviour modification techniques in the establishment of an appropriate self-help, behaviour of low-grade defectives. Accordingly, some of the studies which have been reported within this area of the literature are noted.

A comprehensive review of the applications of behaviour modification techniques to toilet training of mental defectives is included in Section II. Dayan (1964), Baumeister and Klosowski (1965), Hundziak, Maurer and Watson (1965), Bersberg, Colwell and Cassell (1965), Giles and Wolf (1966), Kimbrell, Luckey, Barbuti and Love, (1967), Lohman, Eyman and Lask (1967) and Watson (1967) provide the core of earlier studies in toilet training. More recent work can be attributed largely to Azrin and Foxx (Azrin and Foxx, 1971: Azrin, Bugle and O'Brien, 1971; Azrin, Snead and Foxx, 1973).

Behaviour modification programmes designed to establish self-feeding skills are described in reports by Spradlin (1964), Bensberg, Colwell and Cassel (1965), Gorton and Hollis (1965), Whitney and Barnard (1966), Henricksen and Doughty (1967), Zeiler and Jervey (1968) and Grove and Carrocio (1971). Unlike the toilet training studies, this group of studies is fairly cohesive and most are concerned with a similar objective and adopt procedures which rely upon shaping and prompt and fade techniques. In most procedures, the food constitutes the reinforcer. Gorton and Hollis give a detailed description of the training procedure used. Manual guidance by the trainer of the spoon held by the subject is faded out progressively. The patients were also taught to carry trays to a table, to sit down and to feed themselves. A very similar procedure was used by Whitney and Barnard in their training of a 14 year-old mental defective who was also spastic.

Spoon-feeding by successive approximations was carried out and disruptive meal-time behaviours (such as throwing utensils to the floor) were eliminated. Descriptive behaviour during meals and improper table manners were the focus of training by Heikson and Doughty. Zeiler and Jervey made use of backward chaining in the procedure they report. As in toilet training, Azrin is a recent contributor in this area. Azrin and O'Brien (1972) developed a rapid method of establishing self-feeding behaviour which was effective and feasible in an institutional setting. Surratt, Azrin and Sulzer (1972) further adapted the method (after failure with the original procedure with a group of severe retardates who resisted training)by including the procedure of restitution. Their most recent sophistication of the rapid self-feeding procedure (the intensive 'mini-meal') is reported in Azrin and Armstrong (1973). Self-dressing is a third self-help skill which has been developed in behaviour modification work with mental defectives. Roos (1965), Bersberg, Colwell and Cassel (1965) and Minge and Ball (1967) report on such programmes. Bensberg et al. report that, of seven boys involved, three were able to dress completely (including buttoning and tying of shoe laces) and three partially as a result of a procedure using shaping, prompt and fade, and reinforcement. Similar techniques were used by Minge and Ball in a step-by-step programme which was consistent with the abilities of individual patients. Roos made use of special clothing with extra-large head and arm holes in his programme.

Girardeau and Spradlin (1964) and Gorton and Hollis (1965) included various grooming skills within training programmes. These involved washing and drying of hands, bathing and taking showers, brushing teeth and combing hair. Gorton and Hollis adopted a token reinforcement system and modified aspects of the physical environment to aid training of the girls involved.

Behaviour modification to improve and establish social skills is less frequently reported in the literature. Girardeau and Spradlin trained girls to play group games, such as croquet; Bensberg et al. succeeded in instituting co-operative play (such as ball games) among boys. Hopkins (1968) reports on the modification and maintenance of the smiling response through reinforcement. Whitman, Mercurio and Caponigri (1970) improved social interaction between two severely retarded children. Severely retarded children were trained to respond to sets of instructions in a study reported by Whitman, Zakaras and Chardos (1971). Attempts to develop language skills in defectives have been reported by Kerr, Meyerson and Michael (1965) and Hamilton and Stephens (1968). Imitation procedures appear to be particularly effective in this context. Watson (1967) reports such a study by Baer (1966) in which a puppet was used to shape imitative behaviour in a mentally retarded child, vocal behaviour being included in the chains of responses.

Gardner (1971) notes some of the factors which pose problems in the use of behaviour modification techniques with the severely and profoundly retarded. These include (a) a relatively limited behavioural repertoire; (b) a limitation in the events which have reinforcing properties; (c) difficulty in developing conditioned aversive events; (d) limitations on the use of language in training procedures; (e) skills in imitating are frequently poor or absent; (f) skills in attending to discriminative stimuli are poor; (g) presence of a high rate of disruptive behaviours which are resistent to change; (h) low frustration tolerance, hyperactivity, limited persistence; (i) difficulties in stimulus generalisation.

An earlier, but still pertinent, review of applications of behaviour modification to self-help skills of the severely retarded is provided by Watson (1967). He acknowledges that studies reported demonstrate that such skills can be developed when fairly

systematic training procedures are used. However, he argues that studies have failed to rigorously and systematically examine the contribution of variables to the acquisition of skills. Watson makes a demand for studies to (i) systematically examine variables; (ii) develop alternative reinforcement procedures; (iii) include enquiry of whether or not progress is maintained; (iv) develop transfer of training; (v) include both laboratory and ward-based investigation. In conclusion, Watson states:

> "If research concerned with the application of operant conditioning techniques to institutional problems progresses to a systematic determination of the relevant variables, and application of the method is simplified to the point where less spohisticated 'average' institution-type psychologists and attendants can use it effectively, this method promises to have real practical value for training severely and profoundly retarded children."

Behaviour modification, in developing out of the operant conditioning model, has adopted experimental and empirical approaches in clinical application. Krasner and Ullman (1965) note the "merging of experimental and clinical research" as a trend in behaviour modification research. The process of 'merging' is not without problems and conflicts. Laboratory investigation of behaviour most commonly involves the study of a change in the rate of a single operant in an individual organism with a single reinforcer in a controlled environment. In contrast, ward-based research usually involves several human subjects emitting multiple responses in an environment which contains many complex stimuli and a wide variety of reinforcers. Some of thelimitations of clinical studies noted by Watson (1967) no doubt arise because the compromise between the ideal experimental situation and the practical situation has been weighted in favour of practical issues; and because of some of those problems observed by Gardner (1971), as above.

The experimental design most commonly used in clinical studies is that of comparing the effects of the reinforcement procedure on the response being modified with the condition of that response during a baseline assessment. Kiernan (1973) comments that "this design suffers several faults, prime among which is the possibility that events other than those manipulated may be changing at the same time as the shift from baseline to experimental operation." Kiernan mentions two alternative designs which attempt to overcome the limitations of this common design. These are the 'reversal technique' and the 'multiple baseline' technique. The reversal technique (see Sidman, 1960) entails the recording of baseline frequency, the introduction of the experimental procedure, and then the reversal of contingencies to the baseline condition. This permits demonstration that the causal effect of behaviour change is the experimental procedure by obtaining extinction during the reversal condition. The reinforcement (experimental) procedure is then reintroduced. Ayllon and Azrin (1965) employed this design to demonstrate the causal relationship between tokens and behaviour change in a token economy. Reversal technique is not suitable for use in some applications, for example when self-injurious behaviour requires to be eliminated and reinstatement of the response is unethical and undesirable. The multiple baseline technique involves the assessment of several concurrent behaviours during baseline and then the application of the experimental procedure to one of these only. An example of the use of this design is provided by the study of Barton, Guess and Baer (1970) which concerns improvement in mealtime behaviours by time-out procedures. Both reversal and multiple baseline techniques have the advantage of permitting replication of effects, thus

enhancing the validity and generality of results. Replication can involve intra-or inter- subject designs. In addition to the single-subject approach which is inherited from the operant conditioning model, experimental group designs are relevant in behaviour modification research. The classic design of this kind eschews the employment of matched experimental and control groups (see Meyers and Grossen, 1974). The experimental procedure is applied to the experimental group only. Pre-a nd post-experimental differences between the twc groups can be attributed to the experimental procedure; and thus allows demonstration that the changes in behaviour of experimental group subjects are related to the experimental reinforcement contingencies. Gripp and Magaro (1971) adopted a group design to evaluate the effects of a token economy programme against untreated control ward comparison.

A major appraisal of the methodology of behaviour modification research is presented by Gardner (1969). He examined the methods and results of research on the application of operant conditioning techniques to the modification of the behaviour of mental retardates. He concluded from his literature review that all the studies have violated one or more of the requirements of good experimental design. He identifies these as:-

(i) the exact specification of all relevant independent variables;

(ii) proper sampling techniques;

(iii) use of adequate control procedures;

(iv) proper assessment of the dependent variable;

(v) evaluation of long-term gains.

Gardner concludes; "What is needed at this point is the application of more sophisticated methodology to evaluate the

advancing technology. The diligent researcher should, therefore, make provision for the following in planning studies: (1) direct and indirect measures of both specific and general changes in behaviour; (2) individual as well as group presentation of results; (3) pre- and post- treatment evaluations, including periodic assessment to measure long-term gains; and (4) multivariate manipulation of the independent variables, particularly techniques. The adoption of these procedures would introduce the methodological precision which is currently lacking in the field."

5. Behaviour modification in mental deficiency nursing:

In this country, as in the U.S.A., while many clinical behaviour modification studies have involved nurses, the development of an explicit and independent nursing role in behaviour modification is recent. In both countries, this development has emerged earlier and more quickly within psychiatric nursing than mental deficiency nursing.

Ayllon and Michael (1959), who are U.S.A. psychologists, provided the first analysis of the role of the psychiatric nurse as a behavioural engineer. Layton (1966), a nurse, discussed the implications of behaviour therapy for psychiatric nursing. Implications not only for psychiatric nursing, but also for maternal and child nursing, mental-health nursing of all kinds, and public health nursing are discussed by Brown (1968). The early nursing contributions to behaviour modification in mental deficiency nursing in U.S.A. literature are those of Whitney (Whitney 1966a, 1966b; Whitney and Barnard, 1966). In the two papers by Whitney, theoretical discussion of the behaviour modification model in nursing is developed. Whitney comments that behaviour modification

"may be applied to increase the functional skills of these children (retardates) beyond what was formerly thought possible"; " ... creating environments in which retarded individuals can achieve optimal independent functioning in the area of daily living has become a major nursing responsibility;" " ... it would seem that the operant framework has many implications for nursing. It provides the nurse with a method of combining research and practice and gives her an objective appraisal of her effectiveness." Whitney and Barnard (1966) provide a demonstration of a behaviour modification nursing study in which the principles outlined are applied. This involves a programme to rehabilitate and recondition the feeding behaviour of a mentally retarded girl.

The recognition of behaviour modification as a concept relevant to nursing practice has now emerged. Le Bow (1973), Berni and Fordyce (1973) and Loomis and Horsley (1974) have recently provided the first major nursing literature of behaviour modification in nursing practice. These texts, although dependent largely on the fields of psychiatric and mental deficiency nursing for clinical illustrations of behaviour modification, present behaviour modification as a concept relevant to, and significant in, the total range of nursing practice.

In this country, however, behaviour modification remains as an emerging concept only. Applications of behaviour modification techniques are more or less confined to psychiatric and mental deficiency nursing at the present time. Nursing literature on the subject spans a very short period and is not extensive, being confined mainly to the popular nursing press (Nursing Mirror and Nursing Times). Early reports by nurses include Cumming (1971),

Love (1971), Gray (1972) and Rosenthal, Andrew and Ineson (1972). Gray and Rosenthal et al. both report upon token-economy programmes in a psychiatric setting; and Love discusses applications of behaviour therapy in psychiatric nursing. Cumming describes the setting-up of a token economy programme by nurses for male mental defectives in the ward situation.

More recently, a greater number of nursing reports of applications of behaviour modification and behaviour therapy have been published. The majority arise from the psychiatric nursing field. Bradley(1975), Hawkrigg (1975) and Tatlow (1975) all report on applications of behaviour therapy techniques (relaxation and desensitization) to patients with phobic disorders. Cliffe (1974), a psychologist, describes the behaviour modification programme implemented by a nurse to reinstate speech in an adult chronic schizophrenic. Pyle (1975) discusses a nursing programme which employed behaviour modification techniques (time-out and mild punishment) to reduce the hyperactivity of a disturbed child. The parents were involved in the treatment procedure. A reinforcement procedure implemented to reduce the frequency of nocturnal enuresis in a long-stay psychiatric ward is described by Hartie (1975). Applications of behaviour therapy techniques by nurses in the environmental (behavioural) control of obesity are identified and appraised also by Hartie (1975).

Psychologists and nurses are co-authors of the first two reports reviewed here from the smaller body of behaviour modification literature in the mental deficiency field. Williams and Price (1973) appraise the progress and problems of the first stages of a ward-based token system for nine severely subnormal children. The system was implemented to improve self-help and social skills.

The authors stress the need to accomodate such a system within the established ward routine and to "cue in the staff to the reinforcement system." Paton and Petrusev (1974) describe a nurse-administered treatment procedure to stimulate verbal skills in a group of twelve male adolescent in-patients (high-grade). It is concluded that the "results of this experiment strongly suggest that deliberate and intensive verbal stimulation of mentally retarded patients may indeed be a worthwhile exercise from the nurses' and patients' point of view."

A prize-winning care study written by a student nurse (Connolly, 1975) concerned a behaviour modification programme. This aimed to reduce the demanding, disruptive and destructive behaviour of an adult male mental defective. The target of the programme desired the patient to sit down at his table unaided, to work at a simple task. Although the results showed fluctuations in performance over a 30-day period, some success was achieved by the programme.

Perhaps the most sophisticated of the nursing studies in behaviour modificatinn reported in relation to mental deficiency is that of Barker (1975). This was essentialy a research study, but derived from clinical problems. Four adult male subjects were involved. The procedure attempted to teach basic skills of self-toileting and self-feeding and to eliminate certain related maladaptive behaviours (regurgitation and faecal smearing). The project lasted for 3 months. Details of results are included in the report and it is apparent that the procedures were effective to varying degrees in relation to all targets. It is noted in discussion that "one outstanding feature of the project was the increase in social interaction amongst the four residents;" and that the situation allowed for improved and directed patient-therapist (nurse) relationships.

It is not appropriate to draw conclusions or identify trends from such a small body of literature as to the developments of behaviour modification in nursing (and in mental deficiency nursing in particular). The reports within the literature consist essentially of a group of idiosyncratic case studies. They indicate that an explicit and independent nursing role in behaviour modification has been attempted in some instances. The reports are of a high standard in comparision with nursing literature in general. They demonstrate that nurses have been involved in a range of behaviour therapy and behaviour modification techniques in relation to a variety of behaviour problems and deficits. In most reports, the author(s) makes a point of commenting upon the application of the techniques in nursing as being an appropriate nursing role, a relevant nursing therapy and a satisfying and systematic nursing function.

The role of the nurse in behaviour modification has attracted comment and discussion within some literature and at conferences. It is clear that clarification of the nurse's role (viz a viz that of the psychologist, for example) has not yet been reached. Divergence of opinion can be seen, for example, between Wood (1970) and Graveling et al. (1972). Wood sees the nurse's role to be that of 'therapeutic aide' whereas a much wider and more independent role is envisaged by Graveling et al. Much of the discussion concerning the role of the nurse eschews from the field of psychiatric nursing. However, this is presumably relevant to consider in relation to mental deficiency nursing.

Peck (1973) argues, from a psychologist's stance, that "psychiatric nursing staff have always functioned as agents of

behaviour change. The task is to extend this role, and to train nurses to carry it out more effectively." Hall (1973) notes that "the size of the problem of long-term care is too great for us to afford to be too choosy ultimately and if this type of approach is found to be useful it must be applied to every nurse." These authors are therefore suggesting that behaviour modification techniques provide a general therapeutic approach within nursing rather than a specific and selective therapeutic method to be used by some nurses only. Peck favours the term 'agent of behaviour change' within his discussion.

The use of the term 'nurse-therapist' tends to be adopted by those who diverge from the above view, seeing the role of the nurse to be more specific and selective. Marks (1975) and Hallam (1975) use the term nurse-therapist to describe the psychiatric nurses who have completed the behaviour therapy training course provided by the Maudsley Hospital, London. This course has to date trained a small number of specially selected nurses in behaviour therapy techniques with a view to their independent functioning as therapists. Marks notes that "the nurse-therapists were intended to work with unusual autonomy ... and to become the main therapists for adult neurotic patients who could respond to treatment by behavioural methods." Further, "The development of psychiatric nurse-therapists accords with a widespread trend towards the training of clinical nurse specialists in many other branches of medicine ... Psychiatary is no exception to the general search of nurses for a more advanced clinical role." (The general viewpoint of this psychiatrist is clearly supported by a psychiatric nurse, Cormack, (Fraser and Cormack, 1975) in a recent article.) Examples of the work of the nurse-therapist discussed by Marks and Hallam are available (Lindley, 1975; McArdle, 1975; Mcdonald, 1975; Ramsey,

1975; Deakin, 1975; Lindley, 1975). Aspects of the course are discussed by McArdle (1975).

A syllabus for a post-registration nursing course in behavioural psychotherapy has recently been developed by the Joint Board of Clinical Nursing Studies.

The major discussion available of the role of the mental deficiency nurse in behaviour is provided by Kiernan (1973). He notes that "one of the most significant aspects of this development (behaviour modification) has been the demonstration that these techniques can be taught to nurses, teachers and parents of the mentally handicapped and used effectively by them." Kiernan sees behaviour modification to be an appropriate approach within mental handicap because it has been demonstrated to be effective in establishing self-help and social skills. The prevalence of incapacities in such areas indicates the need for patient training. The nurse is accepted as being the most appropriate worker in mental deficiency to undertake this training, if only because nursing is the largest single profession and provides continuous care. Kiernan indicates that training of nurses in behaviour modification is essential in order to overcome attitudes which exist (and are incompatible with the approach) and prevent misuse of the techniques by unskilled therapists. In concluding the discussion, the necessity to improve the hospital environment and to increase the numbers of nurses is noted as a general requirement for increased patient training. An input of some trained specialists (nurses as well as psychologists or psychiatrists) in behaviour modification to plan and co-ordinate behaviour modification activities is deemed to be essential.

All those writing on the subject of the nurse and behaviour modification (Peck, 1973; Hall, 1973; Kiernan, 1973), whether from

the generalist or specialist viewpoint of the nurse's role, concur on one point: that is, that the nurse requires to be trained to use behaviour modification effectively. There does exist the opinion amongst some nurses (as ascertained in the researcher's survey study and as experienced in many discussions with nurses) that training is unnecessary. Some evidence is now available to contradict such pragmatics.

Buehler, Patterson and Furniss (1966) and Gelfand, Gelfand and Dobson (1967) show that nurses are not intuitively consistent behaviour modifiers. Both studies demonstrate that maladaptive behaviour is frequently reinforced by nursing staff and that adaptive behaviour tends to be ignored. Buehler et al. studied the rewards and admonishments administered by staff in an institution for juvenile delinquents, and showed the responses of staff to be highly inconsistent. Gelfand et al. observed reinforcement contingencies in a psychiatric ward. They found the patients to be best at ignoring each other's inappropriate behaviours (79% of the time). The nursing assistants ignored inappropriate behaviour only 64% of the time and positively attended to it 30% of the time. Nurses performed most poorly. They reinforced inappropriate behaviour 39% of the time. However, of the three groups, the nurses attended most appropriately to desirable prosocial skills (68% of the time). Gelfand et al. conclude that "the results indicate that staff members in the hospital under study are not currently providing maximally effective reinforcement contingencies for psychotic patients."

Trudel, Boisvert and Leroux (1974) have contributed further evidence to the debate by investigating the effects of training in behaviour modification upon nurses' responses to patient behaviour.

They studied reinforcement contingencies in two wards. In one ward the nurses had been trained in operant conditioning and a token economy programme was operating. In the other ward, no training was given and no programmed treatment operated. In short, the results showed that the trained staff appropriately reinforced patients approximately six times more frequently than the untrained staff.

In the absence of further evidence, the indication is that, without training in behaviour modification, nurses do not effect appropriate reinforcement contingencies; and, following training, nurses' performance is improved. Another study may have bearing upon nurses' performance in the mental deficiency field where of major import is rehabilitation and training is the encouragement of independent behaviour. Mikulic (1971) studied the attention of nurses in the general field to various patients. It was shown that nurses tended to give more social attention to those patients displaying dependent behaviour rather than to those showing greater initiative and independence.

Although the training of nurses in behaviour modification can therefore be seen to be essential, methods of training and evaluation of training remain undeveloped. Until recently, such training that has been attempted is confined to experimental in-service training programmes within individual hospitals. Much of this work is not available in publication. An exception is a training programme reported by Kiernan and Riddick (1973). This consists of two components - written units and related practical training tasks. The programme is evaluated by a series of set tasks. It was developed for the training of nurses involved in a world-wide behaviour modification programme for severely subnormal children (Kiernan,

Donoghue and Hawks; 1971).

The most recent development in nurse training in behaviour modification is the provision of post-registration nurse training courses. These will be based on the syllabi drawn up by the Joint Board of Clinical Nursing Studies (England and Wales, 1973) and the Committee for Clinical Nursing Studies (Scotland, 1974). The syllabi are essentially similar and both proposed courses are six months' long. The J.B.C.N.S. syllabus (Behaviour Modification in Mental Handicap for Registered Nurses) pertains to mental handicap nursing only. It aims "To help registered nurses working in the field of mental handicap to develop general therapeutic skills in order to modify the behaviour of the mentally handicapped to a socially acceptable level, and to co-ordinate the activities of the other nurses and personnel in the therapeutic team." (One course is in operation at Lea Hospital, Birmingham). The C.C.N.S. syllabus (Behaviour therapy in psychiatric and mental handicap nursing) aims "To prepare registered nurses, working in either psychiatric or mental handicap nursing, to understand and gain experience in the application of the principles and practice of behaviour therapy." The course consists of common orientation and consolidation periods for both groups of nurses, these modules being predominantly theoretical with concurrent practice. The main module is predominantly practical. In this, psychiatric nurses specialise in behaviour therapy in psychiatric services; and mental handicap nurses in behaviour modification in mental handicap services (hospital and community). The introduction of these courses is a significant development for behaviour modification in mental deficiency nursing.

## SUMMARY

It can be seen that the areas of study and discussion which impinge upon the subject of the present research are many and various. Some especially relevant points are collected together in summary.

The conventional role of the nurse in mental deficiency has been questioned, and is now generally considered to be inappropriate within the context of recent developments in mental deficiency services. Indeed, it appears uncertain what constitutes mental deficiency nursing. The Briggs Report recommends the emergence of a new 'caring profession' and the need for nurses to develop an emphasis on the social and therapeutic aspects of care as well as the physical aspects. A Committee has been established to enquire further into mental handicap nursing and care (the Jay Committee.)

Community services for mental defectives are currently being expanded. Hospital services are being improved. The types and prevalence of incapacities associated with mental deficiency are known and affect low-grade mental defectives more severely. It is this group of patients which constitutes the main requirement of hospital services, and there is increasing concern to attempt to minimise the incapacities of patients through training. Behaviour modification principles and techniques have been demonstrated to be particularly relevant in the training of mental defectives. Evidence is available to show the effectiveness of the techniques to the range of behaviour deficits and problems of patients and to all grades of mental defectives.

Behaviour modification has recently emerged as a potentially significant method in mental deficiency nursing practice and the ability of nurses to apply the techniques effectively has been

demonstrated. It appears, however, that nurses require to be trained in order to do so. There is some doubt as to whether behaviour modification constitutes a generalist or specialist approach in mental deficiency nursing.

There exists a large body of research in relation to behaviour modification, although the need to introduce methodological precision in research has been noted. The implications of this research evidence have not been investigated by nurses. Research in nursing is a redeveloping phenomenon and there is a recognised need for the undertaking of clinical nursing studies and for the use of experimental method.

## SECTION II:

The Experimental Study: Evaluation of a behaviour modification toilet training programme with a group of incontinent mental defectives in their usual ward environment.

Chapter 3: Introduction to the experimental study.

Chapter 4: Literature review.

Chapter 5: Method (I) - Experimental design and experimental situation.

Chapter 6: Method (II) - The patients.

Chapter 7: Method (III)- The nurses.

Chapter 8: Method (IV) - Procedure.

Chapter 9: Results (I) - Results of Experiment I

Chapter 10: Results (II) - Results of Experiment II

Chapter 11: Results (III) - Miscellaneous results.

Chapter 12: Summary of results of experimental study.

Chapter 13: Discussion of the experimental study.

## CHAPTER 3: INTRODUCTION TO THE EXPERIMENTAL STUDY

The general aim of this study, as stated in the introduction (ch. 1), is:-

> To evaluate the effectiveness and practicability of the the implementation, by nurses, of an experimental behaviour modification toilet training programme with a group of (low-grade) mental defectives in their usual ward environment, utilising the available complement of staff and existing resources, and minimising changes in the routine.

The underlying assumptions of this aim are summarised as follows on the basis of previous evidence and discussion:-

1. that there is a high prevalence of incontinence in the population of hospitalised mental defectives;

2. that incontinence constitutes a problem for both patients and nurses;

3. that the responsibility for the management, care and training of incontinent mental defectives is primarily a nursing responsibility;

4. that mental deficiency nurses have not developed an active role in training and rehabilitating patients;

5. that the need for mental deficiency nurses to develop a more therapeutic role is recommended;

6. that there is evidence noting an absence of toilet training of mental defectives by nurses and little evidence indicating that nurses have carried out such clinical work or research;

7. that evidence is available (from research carried out by psychologists in the U.S.A.) to show that behaviour modification techniques can be applied effectively in toilet training incontinent mental defectives;

8. that it would appear that mental deficiency nurses, although acknowledging that incontinence is a problem and that toilet behaviour can be established in incontinent mental defectives, feel that such training programmes cannot be implemented under present conditions in mental deficiency hospitals.

The basic question of the study develops from the last statement and can be simply stated as: 'Is behaviour modification toilet training an effective and practicable solution to the nursing problem of

incontinence in mental deficiency hospitals?' To answer this question, the study required to involve the implementation of a behaviour modification toilet training programme and to include evaluation of its effectiveness and practicability. In view of the complexity and length of this requirement, it was proposed to implement one programme in one particular ward situation only. However, the basic question of the study implied the need to obtain results which could be generalised. To this end, several aspects were included within the research design:-

(i) selection of a representative (typical) ward situation;

(ii) use of experimental method;

(iii) explication of the experimental procedure;

(iv) adoption of multiple evaluative measures;

(v) replication of the experimental procedure.

These aspects are described in detail later in this Section and the main features only of the study are noted here.

Several features were assumed to constitute a 'representative ward situation'. These included:-

a. a relatively low nurse: patient ratio, with untrained staff providing the majority of the complement of nursing staff;

b. a relatively large patient population (a ward) with a high prevalence of incontinence and other incapacities associated with mental deficiency;

c. inexperience of nurses in behaviour modification principles and techniques and the absence of a predominantly therapeutic approach to nursing practice;

d. absence of a purpose-built training environment and other environmental advantages and resources.

One ward (Lewis Ward) of the Royal Scottish National Hospital was selected as the experimental situation. The ward contained 52 mental defectives. Most of the patients were classified as low-grade defectives. The age range was 4 - 20 years. The majority of

the patients were male. The prevalence of incapacities associated with mental deficiency was high. According to the nurses' categorisation, 12 patients (23.1%) were toilet trained; 12 were being potty trained at the time (23.1%); and the remaining 28 patients (53.8%) were incontinent, and considered to be 'untrainable'. The physical environment contained the necessary facilities, but was institutional. It lacked environmental stimulation, provision for individuality and a homely atmosphere. The nursing staff (at the start of the study) comprised 5 trained nurses and 15 untrained nursing assistants. Staff turnover was high. Nurses adopted a conventional nursing role and had not attempted any systematic patient training. The nurse: patient ratio (during a five-week assessment period) ranged from 1:13 to 1:7.4 (mean of 1: 9.1). The nurses involved in the study were not selected and no controls were introduced on staff turnover, nurse: patient ratio, or selection of new staff.

The method of the study adopted an experimental research design. A two-group design (experimental and control group) was used in the experimental toilet training programme. The research sample ($n = 36$), selected from the total population ($N = 52$), was allocated by a procedure of precision matching and randomisation to the two groups. The experiment (Experiment I) involved the application of the experimental procedure (the behaviour modification toilet training programme) to the experimental group patients only. Evaluation of the experiment was undertaken by comparing the post-experimental status of the two groups. A pre-post-test single-subject design was incorporated within the two-group design to permit individual, as well as group, analysis.

The experimental procedure was the behaviour modification toilet training programme. It was implemented by the nursing staff (under

the instruction and supervision of the researcher) over a 90-day period. The programme related to two objectives:- (1) to decrease the frequency of incontinent elimination responses; (2) to increase the frequency of elimination responses in the toilet and to establish and strengthen toilet behaviour. Extinction techniqes were employed in (1); and positive reinforcement techniques, particularly behaviour shaping, in (2). Training related concurrently to both urinary and faecal elimination.

Multiple evaluative measures were employed in the study. As evaluation of the effectiveness of behaviour modification adopts the main criterion of changes in the rate of emission of an operant by a single organism, measurement of the frequency of elimination responses of each patient constituted the primary evaluative measure. In addition, changes in toilet behaviour were measured (according to responses acquired as identified within a 'model of toilet behaviour' developed for the study). Intermittent assessments of the patients' general level of functioning were made using Gunzburg's Primary Progress Assessment Chart (P - PAC).

Evaluation of the effectiveness of the experiment was further enabled by monitoring the effect of decreased incontinence on linen usage; and by deducing (from records of individual elimination responses rates) changes in the prevalence of incontinence in the ward overall.

Evaluation of the practicability of the programme in a ward situation was made from the nurses' viewpoint rather than changes in patients' behaviour. Anxieties had been expressed to the researcher that the introduction of such a training programme might conflict with problems of staff shortage and a busy nursing routine. It was suggested that some nursing duties might be displaced by their concentration on training. It was considered to be outwith the scope of the study

to monitor in detail the effects of the programme upon the nursing staff. However, an attempt was believed to be feasible and desirable to measure objectively the effect of the programme upon the nurses' work activities. A simple work study was carried out pre-and post experimentally. Originally, it had been hoped to gain data from the nurses concerning their reactions to the study and a questionaire was designed and piloted for this purpose. It was distributed to nursing staff at various points during the period of the study. It concentrated upon eliciting the attitudes of nurses towards the training programme and the study, and was intended to allow any changes in attitudes to become apparent. Due to the unexpectedly high staff turnover, consistency of data collection was inadequate and the data do not merit analyses on this account. However, subjective assessment of the nurses' responses to the study can be attempted on the basis of records maintained of the researcher's interactions and discussions with the staff.

A replication of Experiment I was undertaken. This involved the adoption of the original control group as the second experimental group (Experiment II). As no control group was then available, the design relied upon a pre-post-test, single-group experiment.

The study was developed to investigate the practical nursing implications of evidence that behaviour modification toilet training can be effective with mental defectives. It was conceived as a nursing study. However, it was felt that the implementation of a large-scale behaviour modification toilet training programme provided the opportunity to contribute to the general body of knowledge concerning toilet training of mental defectives. Several areas of knowledge remain undeveloped or lacking in empirical evidence within the literature. (These are noted here, but discussed fully in the

in the following literature review).

The need to investigate the long-term effects of behaviour modification toilet training is clear. Previous studies are, on the whole, limited by an absence of such investigation. Evidence indicates that behaviour change can be achieved in the short-term, but it is equally necessary to establish whether or not such results are enduring, and whether or not regression to pre-training level of performance is indeed a major problem in respect of toilet training. A long-term follow-up evaluation procedure was therefore included with in the design of the present study.

Within the literature there is the suggestion that regression may be linked to a lack of stimulus generalisation. It appears that regression may coincide with transfer of patients back to their original living unit when training has been conducted in an isolated and controlled environment. The decision to use the patients' usual ward environment in the present study was related to the aim of the study. (That is, to test the effectiveness of training in a representative nursing situation). However, this also permits comment to be made on the relationship between the training environment and subsequent regression or progression.

The procedure of the present study was developed from the available information provided in the literature. The researcher had no experience of applying behaviour modification to mental defectives and no practical experience in particular, of toilet training. Practice and experience, to a very limited degree, were obtained in pilot work carried out in three mental deficiency hospitals. This involved the observation and functional analysis of the toilet and incontinence behaviour of mental defectives ; and practice attempts at utilising positive reinforcement techniques. Literature on behaviour modific-

ation toilet training is lacking in the procedural detail required for replication of a study. Thus, the procedure of the present study was developed as an amalgam of aspects of procedures reported. The main concern was to develop explicit principles for a procedure of toilet training; and to identify the components of toilet behaviour. This seemed imperative to allow the experimental procedure to be standardised and to be appropriately evaluated. In addition, the nurses required to be taught the procedure in preparation for the experiments. The formulation of 'the model for shaping toilet behaviour' was an attempt to identify the components of toilet behaviour and to specify procedural principles on this basis.

Some data are available to indicate the relationship between patient characteristics and readiness for toilet training. However, no concensus of evidence has been reached. It was therefore felt that the provision of detailed data on patients would allow analysis of any suggested relationships to be done. It is relevant for nurses to have empirical data from which to find direction in the selection of patients for training. It became apparent to the researcher, in discussions with nurses in mental deficiency, that often subjective and untested selection procedures are adopted. In discussing toilet training of patients, nurses frequently asserted that 'untrainable patients' included those who were limited in mobility, older, or unresponsive; and those who had always been incontinent or had been in hospital for a long period.

Although seldom reported in detail, it is suggested in the literature that toilet training may result in improvements also to other aspects of functioning. In order to investigate whether this does occur, the present study was designed to include assessment of the patients' general level of functioning.

Thus, the study accomodates both the specific aims of the nursing investigation and, in addition, some more general aims which appeared to be relevant in view of limitations of previous studies. Collectively, the objectives of the present study are summarised below:-

1. To evaluate the effectiveness and practicability of a behaviour modification toilet training programme for a group of mental defectives within a representative nursing context, in relation to:-
   (i) the frequency of patients' incontinent elimination responses;
   (ii) changes in the toilet behaviour of patients;
   (iii) prevalence of incontinence in the ward overall;
   (iv) reduction in the amount of linen used due to incontinence;
   (v) changes in the pattern of nurses' work activities;
   (vi) changes in the attitudes and behaviour of the nursing staff.
2. To investigate the long-term effects of behaviour modification toilet training on the toilet behaviour of patients in relation to regression or progress occuring subsequent to training.
3. To develop an explicit procedure for behaviour modification toilet training of mental defectives by nurses and a related method of evaluation.
4. To look at the relationship of patient characteristics to successful or unsuccessful response to toilet training.
5. To monitor changes in the general level of functioning of patients during a training programme concerned with one specific behaviour (toilet behaviour).

The study was undertaken over a period of approximately 18 months. It involved the two experiments (Experiment I and its replication, Experiment II) and four assessment periods. Assessment 1 comprised the

pre-experimental data collection period of Experiment I. Assessment 2 comprised the post-experimental data collection for that experiment and also provided the pre-experimental data collection period for Experiment II. Assessment 3 comprised the post-experimental period of Experiment II and provided the first follow-up evaluation of Experimental Group I. The second follow-up evaluation of Experimental Group I took place along with the single follow-up evaluation of Experimental Group II at Assessment 4.

Fig. 3 contains a diagram to clarify the sequence of the study.

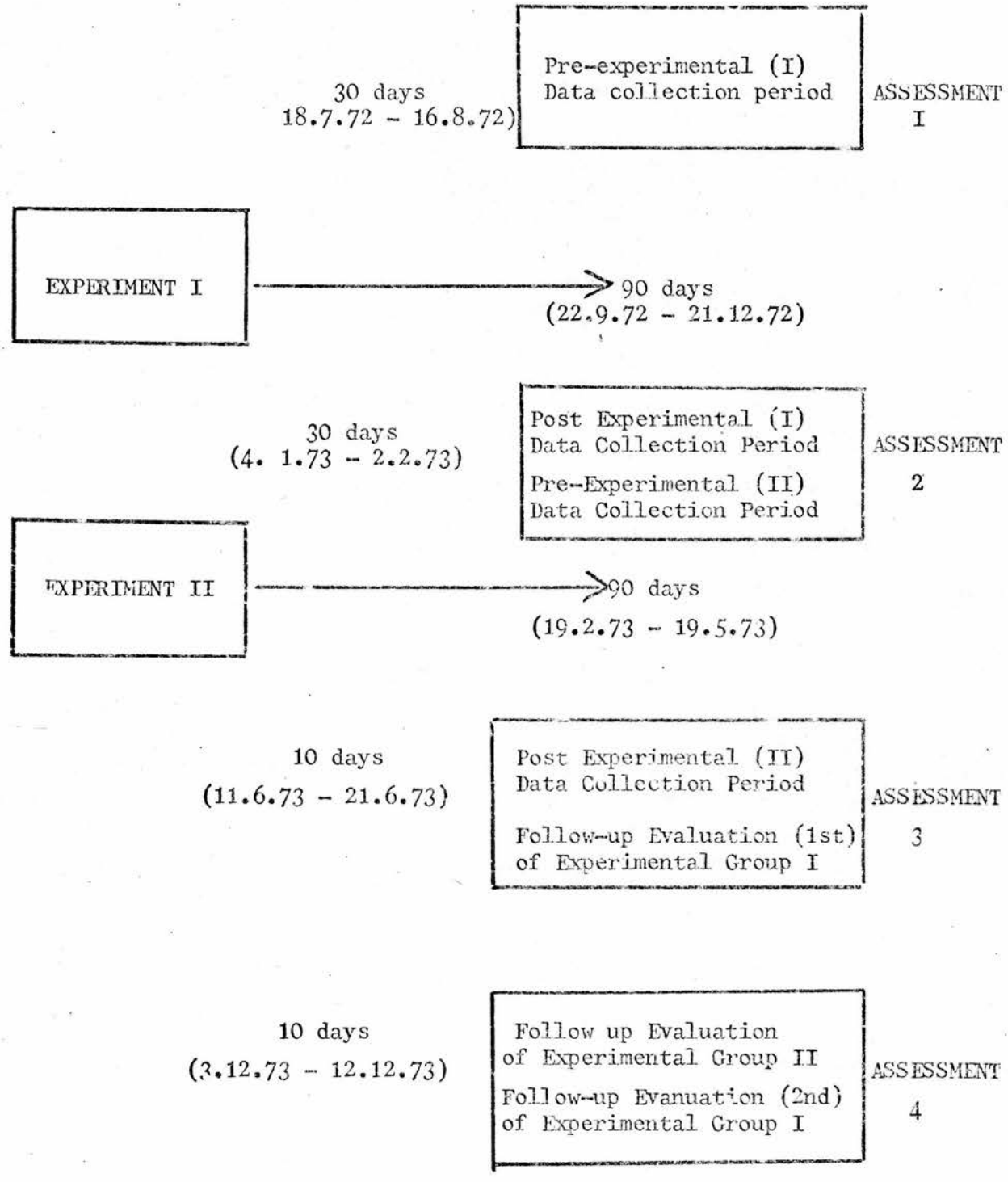



Figure 3:
the Sequence of the Study.

CHAPTER 4:

LITERATURE REVIEW

The composite body of literature directly relevant to the experimental study consists of studies of behaviour modification toilet training involving mental defectives. These in fact constitute the only substantial contribution to the study of incontinence in mental deficiency. A wider literature related in general to the problem of incontinence and methods of toilet training was reviewed. This literature chiefly concerns the problem of primary incontinence in children (of normal intelligence) and that of secondary incontinence in geriatric or psycho-geriatric patients. Some areas of this general literature are reviewed in view of their consequence to the present research.

## 1. General Literature Review

Terminology used in the literature is first clarified. 'Incontinence' is the generic term which refers to a person's inability to control the elimination of urine ('urinary incontinence') or faeces ('faecal incontinence'), or both ('double incontinence'). 'Enuresis' and 'encopresis' are synonymous with the terms urinary and faecal incontinence respectively. The adjectives 'nocturnal' (night-time) and 'diurnal' (daytime) are sometimes used to further clarify the problem of enuresis. A distinction between 'primary' and 'secondary' incontinence is made above. The former refers to cases in which normal development of continence in childhood has never been attained. Secondary incontinence therefore describes cases occuring subsequent to previous attainment of continence. Incontinence can be described as 'temporary' or 'enduring'; and 'regular' or 'intermittent'.

Incontinence in children is most often primary incontinence and enuresis is more prevalent than encopresis. Nocturnal enuresis

presents a particular problem and this has attracted much of the research attention to incontinence. Illingworth (1967) describes normal development of continence as involving the acquisition of voluntary control of the urethral and anal sphincters which takes over from the reflex act of micturition and defaecation in infancy. This development begins at about 15-18 months of age when the child starts to indicate his need to use the pot or that he has wet his pants. Although occasional accidents result from urgency to micturate, the child then begins to stay dry during the day. Bowel control usually precedes bladder control. By the age of 2 years, the child usually remains dry throughout the night also, if lifted. After about 6 months more, he can begin to attend to most of his own toilet needs independently. By the age of 5 years, Illingworth concludes, some 90% of children have attained continence. Willington (1975) supports this analysis:

> " .. by the age of 5 years, the majority of children have achieved this delicate and complicated neuromuscular control: sanitary competence, a skill known as continence."

Jones (1960) constructed graphs of the probable incidence of enuresis on the basis of data from Crosby (1950), Bransby, Blomfield and Douglas (1955) and Hallgren (1956, 1957). These data indicated that probably at least 20% of all children (normal) are nocturnally enuretic after the expected development period; and that incidence declines steadily up to adulthood. In respect of secondary enuresis, the incidence-curve differs. This rises to a peak at 5 years of age and declines to almost zero by 10 years. Meadow (1970) estimates that there may be as many as 400,000 enuretics within the total population. Little data exist on the incidence of encopresis in childhood. It is generally acknowledged that this problem is much less prevalent than enuresis. Shirley (1938) reported on incidence of 3% in a sample of children referred to a psychiatric clinic.

Distinction must be made between incontinence in childhood which is caused by disease of the nervous or uro-genital systems or significant psychological disorder, and that without known organic cause. Only a minority of cases have organic aetiology. In relation to the majority (non-organic), aetiology is viewed from two points of view. The first is psychoanalytic and relates failure to become continent with anxiety of emotional factors. Meadow (1970) links the occurence of childhood enuresis with stressful incidents happening in the third year of life. MacKeith (1972) indicates the second and fourth years as critical periods of learning. He suggests that failure to acquire continence then inhibits its acquisition throughout the subsequent five years. Psychodynamic formulations all agree that incontinence is a symptom of an underlying psychological or emotional disturbance. Psycho therapeutic treatment of the disturbance is considered to be essential and symptomatic treatment to be ineffective (and possibly harmful in leading to displacement to other more serious symptoms).

The second viewpoint considers that incontinence results directly from absence or ineffectiveness of toilet training. Toilet training of normal children is based on the typical pattern of development as noted (Illingworth, 1967). Current theories and practice concerning the optimum method vary considerably and it is well known that parents are exposed to many conflicting or transient doctrines. Two questions appear to be related to the problem. One concerns the optimum age at which to begin toilet training. The other is whether or not the child's temporal pattern of elimination should be used as a basis for the scheduling of toilet sessions. These questions are discussed by McGraw (1940). His investigations aimed to determine sequential changes in behaviour which accompany and denote the development of voluntary control of micturition and to ascertain the effect of early systematic training

upon the ultimate achievement of bladder control . McGraw refers to Scoe (1933) and Blatz (1928) as advocates of early training within the first few months of life; and to Gesell and Ilg (1937) as supporters of the value of scheduling training according to the child's natural rhythms of micturition. McGraw's study involved two sets of identical twin boys. One set was studied from 23-470 days of age, and the other from 41-800 days, in the laboratory. During one day of each week, the time and frequency of micturitions were recorded. The hypothesis assumed that physiologic growth in the function of micturition would be reflected by an increase in the amount of urine voided at micturition and by a decrease in the frequency of micturition. On the remaining days (4) of the week, toilet training was carried out. This commenced immediately with one boy from each set of twins, and later with the other boys. The ratio between positive responses in the pot and total number of urinations per day was called the 'success factor' in toilet training. Results provided no tangible evidence that a basic physiologic rhythm develops upon which regularity of potting can be based. In addition it was concluded that "early toilet training is, to say the least, futile". McGraw postulates that bladder control is related to neural maturation and that "training should be postponed until evidence of cortical participation in the act of micturition is manifested." Illingworth (1967) comments, in support of this, that primary enuresis is usually due to delayed maturation of the nervous control of the bladder. An interesting finding is presented by Doyle (1975). He points out that "most enuretic children have abnormal bladder contractions, which mean that when the kidneys have secreted a relatively small volume of urine into the bladder it begins to contract and the child is unable to inhibit the contraction."

These questions apart, consideration of incontinence as a deficiency of training has resulted in the development of methods of training for continence. This consideration has relied upon behaviouristic formulations of the problem and training methods derived from classical and operant conditioning models.

Conditioning using an automated wakening device (otherwise called 'pad - and - bell' or 'buzzer alarm') has been widely used for the treatment of nocturnal enuresis. An early description of this device is provided by Mowrer and Mowrer (1938). The rationale for its development is based on their observation: " ... that children do, in fact, require special assistance in the acquisition of this particular mode of control (bladder control) ... is attested by the common practice of periodically arousing them from sleep in anticipation of the need to urinate." It is suggested that this awakening is usually arbitrarily determined and could be more expedient if linked to bladder distension. The awakening of the child just after the onset of micturition would be followed by sphincter contraction and inhibition of further urination. Subsequently, reflex urination during sleep would cease as the ability to retain urine was developed. To this end, an automated awakening device was built. The apparatus consisted of two pieces of bronze screening separated by a cloth sheet, insulated wire within the screening being connected to a small battery. When urine is passed, the pad is short-circuited (due to electrolytic properties of urine) and a second circuit triggers off the wakening stimulus (bell or buzzer). Mowrer and Mowrer reported success in eliminating enuresis in all of 30 children (aged 3-13 years), the maximum treatment time being two months. It is interesting that these authors, invariably credited with the introduction of the device, include reference to an early description of a very similar apparatus (Pfaundler,

1904). Genouville (1908) and Remy-Roux (1910) are quoted as reporting dramatic success with Pfaundler's apparatus. However, its cumbersome and inefficient design appears to have prevented widespread use.

Jones (1960) reviewed 12 studies involving a wakening device conditioning method. Overall, these included more than 1,000 children and success rates ranged from 33% to 100% (the average being 90%). Doyle (1975) notes that success rates as high as 80% have been recorded, but that "most children need to use the bell for some time if a cure is to be produced." Lovibond (1964) claims an absence of relapses following conditioning treatment.

The precise nature of the mechanisms operating in this method of training has not been agreed. Mowrer and Mowrer provide explanation in terms of classical conditioning. The conditioning involves the establishment of a functional connection between bladder distension stimulation and the waking/inhibition response. Crosby (1950) argues that, in most cases of enuresis, wetting occurs, not as an unconditioned reflex but rather as a conditioned response. He states that his treatment, which involves the use of electric shocks, is aimed at: " ... extinguishing any conditioned responses which initiate micturition, and at reinforcing the natural method of building up the 'inhibitory' tone which is considered necessary for continence." Lovibond (1963, 1964) criticised the classical conditioning model put forward by Mowrer and Mowrer and adumbrated by Jones (1960). He argued that their paradigm differed from the classical Pavlovian model. Lovibond formulated a theory in terms of instrumental avoidance conditioning in which wakening was not essential to the success of the treatment, the technique utilising a twin-signal apparatus to condition escape from the aversive stimulus (the bell).

Willington (1975) bases his analysis of "conditioned reflex training" on the classical conditioning model. Here the features of "paradoxical" and "ultra-paradoxical inhibition" are stressed.

The more recent exposition of the theoretical analysis of the conditioning of elimination response utilises the operant conditioning model. Turner, Young and Rachman (1970) discuss their treatment of nocturnal enuresis after this model. Neale (1963) describes the effectiveness of operant conditioning treatment of encopresis in the treatment of three of four children involved in his study. The operant conditioning model has been almost exclusively applied, however, to methods of toilet training for mental defectives. N.H. Azrin and colleagues began their work on behaviour modification toilet training in the field of mental deficiency. More recently they have applied their rapid method of behaviour modification toilet training to normal children. Azrin, Snead and Foxx (1974) report effective application to the problem of nocturnal enuresis.

Azrin (1975) describes rapid toilet training of normal children by behaviour modification as an alternative method to conventional training over the developmental period.

Some attempts have been made to compare the efficiency of the two main treatment approaches described (psychotherapy and conditioning). Werry and Cohrssen (1965) and DeLean and Mandel (1966) provide evidence from two studies that conditioning methods are more effective. McConaghy (1969) undertook a controlled trial to compare chemotherapy, conditioning(pad-and-bell method) and random awakening in the treatment of nocturnal enuresis. The conditioning method produced the best response, both initially and at follow-up. There was considerable relapse with the gradual withdrawal of drugs.

Incontinence in old age, one manifestation of secondary incontinence, is a much more diverse problem than primary incontinence in childhood.

Statistics of the incidence of incontinence among old people are available from several sources. Isaacs and Walkley (1969), from a survey of elderly hospital patients, conclude incontinence to be present in 40% of male patients and 46% of females. Willington (1969) showed that approximately 33% of 900 geriatric patients were incontinent on admission to hospital. Some time after admission, only 14% of this patient group remained incontinent and these constituted 'established cases' of incontinence. Statistics relating to the prevalence of incontinence in the elderly living at home are less easily obtainable. An estimate that about one-fifth of all people aged 65 years and over are incontinent is provided by Brocklehurst, Dillane, Griffiths and Fry (1968) from a survey of the prevalence and symptomology of urinary infection.

A variety of aetiologies are associated with incontinence of the elderly. Degeneration of cerebral function in senescence; specific neurological impairment (e.g. cerebral vascular accident); decline in muscle tone; reduction of bladder capacity; and specific disorders of the uro-genital tract (e.g. urinary infection) may be causal, contributory or precipitating factors in incontinence. Brocklehurst (1967) indicates that admission to hospital may be a particular precipitating factor within the geriatric population in hospital. Persistence of the condition may be related to its psychological and emotional consequences (Sutherland, 1971). Negative attitudes of nursing staff may have a similar function (Schwartz and Stanton, 1950). Inappropriate toilet training procedures by

nurses may inhibit the patient's potential for retraining (Willington, 1975). Impairment of locomotor status (or, at least, loss of speed in mobility) may result in the inability to reach the toilet and, in hospitals, toilet facilities are often inaccessible and inadequate (Wells, 1975).

Thus the problem of incontinence in the elderly can be seen to differ from that in children in several respects. Although not evidenced, the majority of cases in the elderly population involve aetiology of an organic nature. Physiological changes naturally occuring in old age reduce the ability of independent toileting, and the competence of voluntary control over the urethral and anal sphincters. Probably because incontinence in old age prohibits independent living in the community, most studies concerned with the treatment of incontinence in the elderly have derived from hospital populations. As noted, the prevalence within geriatric hospital populations is high. Urinary incontinence is the greater problem again, although double incontinence is not uncommon.

In outlining general principles of the management of incontinence, Willington (1975) notes four aspects of medical treatment - drug therapy; appliance therapy; operative therapy; and continuous cystometry. He considers the nursing component of treatment to involve:- nursing diagnosis; the creation of an appropriate ward atmosphere; counselling of patients; nursing management of patients who remain incontinent; and the administration of prescribed drugs. Willington stresses the importance of introducing methods of retraining and training patients for continence. Wells (1975) identifies environmental and physiological factors which nurses should consider in promoting continence in geriatric patients. Environmental factors specified are:- 1. adjustable bed height to

encourage mobility; 2. chairs suitable to ease rising; 3. short distances to labelled usable toilets; 4. toilet alternatives (e.g. commodes); 5. provision of privacy and call-alarms; 6. suitable clothing; and 7. a motivating environment. Physiological factors specified are:- 1. adequate fluid intake; 2. bowel regularity; 3. assessment and treatment of acute urinary infections; 4. sensible use of medications; 5. genito-urinary and gynaecological assessment; 6. medical assessment. Brocklehurst (1967) indicates the importance of ascertaining the patient's pattern of elimination as a prerequisite to planning nursing treatment. Methods of treatment of childhood enuresis are limited mainly to psychotherapy and conditioning, as noted. Medical treatments, however, appear to have dominated in the geriatric, psychiatric and psycho-geriatric fields. These tend to relate to treatment of the complications of incontinence rather than to re-establishment of continence. Methods of re-establishing continence reported include (i) habit-training; (ii) socio-psychological approach to training; (iii) operant conditioning.

The method of toilet training probably most frequently used by nurses is that referred to as 'habit training.' From verbal accounts of nurses (no literature could be found), this would appear to consist of regular toileting of incontinent patients. Altschul (1966) suggests that habit training is appropriate for patients who "have become helpless and bedridden and whose habits have deteriorated to such an extent that they are incontinent, unable to attend to their physical needs and unable also to respond to any form of emotional or social stimulation." In habit training, "these aspects are carried out habitually, requiring no choice, decision or thought." Altschul implies that the essential feature

of this method is "following an invariable routine." Ojo (1972) defines habit training as "recreat (ing) the automatic carrying out of a a once familiar habit pattern"; and habits as "learned responses facilitated by repetition of the act."

The socio-psychological approach to training is described by Schwartz and Stanton (1950) in the context of a mental hospital. Three concepts were seen to be central to the investigation conducted:- (a) a mental hospital ward is an interaction system; (b) psychiatary concerns a study of inter-personal relationships; (c) the pattern of participation within the patient group is relevant to an understanding of the activities of individuals. Incontinence was considered to be a significant factor in social participation. It was hypothesised that, if the social structure related to this factor could be determined, then it could be altered and incontinence eliminated as an aspect of mental illness. An observational study was undertaken with 3 patients over a 10 - month period. Relationships between attitudes surrounding the patients' incontinent activities were identified. When the negative sets of atitudes were replaced by positive (therapeutic) ones, incontinence rarely occured.

The use of operant conditioning techniques in toilet training adults (other than mental defectives) has been reported from various studies. Grosicki (1968) evaluated the effect of this method in 'neuropsychiatric geriatric patients'. Wagner and Paul (1970) conducted a pilot study in a mental hospital and reduced encopresis in all 19 patients of their sample as a result of conditioning (classical and operant) procedures implemented. They note in introduction:

> "Most cases of incontinence do not appear to be the result of either central or peripheral organic impairment (see Grosicki, 1968). Rather, incontinence, like many other 'deviant' behaviours of chronically institutionalised individuals, may be a positively learned behavioral pattern acquired as a function of contingencies existing within the institution itself (see Ullman, 1967; Ullman and Krasner, 1969)."

The nursing study by Hartie and Black (1975) in which nocturnal enuresis of psychiatric patients was reduced by behaviour modification based procedures has previously been outlined and serves as a further illustration of this approach.

Mowrer and Mowrer (1938) identify from the literature referring to treatment of incontinence" .... a remarkable array of proposed curative measures, ranging from patent superstitions and magical nostrums to a wide assortment of allegedly scientific methods." Werry (1965) reports similarly that " .... the literature is vast, yet the aetiology remains obscure and the efficacy of different therapeutic approaches contentious." Mowrer and Mowrer further comment: "In the hands of a limited number of individuals, virtually every method which was proposed seemed to produce cures; the inability of other persons to obtain equally good results by what appeared to be precisely the same objective procedures eventually made it clear that the effectiveness of these was more a function of subtle psychological influences than of the particular physical praxis involved."

Werry and Cohrssen (1965) state: "Most of the literature ... is remarkable for the absence of controls, for biased sampling, and for lack of rigor in linking slender empirical fact with elegant theory."

The above quotations pertain specifically to studies on enuresis but serve collectively to make a general point about research conducted to investigate treatments of incontinence. That point is that there exists very little valid and conclusive evidence upon the subject. However, studies undertaken have provided wide-

ranging information and implications relevant to the problem of incontinence. Some of these can serve to clarify and broaden the discussion of the present study and that of the problem of incontinence in mental deficiency nursing.

The prevalence of incontinence in mental deficiency (U.K.) hospitals can be reported from two main sources (D.H.H.S., 1972; Morris, 1969). The D.H.S.S. 1970 census of patients in mental deficiency hospitals (D.H.S.S., 1972) reports that 20% of all patients are severely incontinent and 10% so to a lesser degree. 70% are continent. The incidence of continence is higher in the adult population (74%) than in the juvenile population (24%). 63% of all children (aged under 15 years) are classified as severely incontinent and 13% as incontinent to a lesser degree; 16% of incontinence amongst adults is described as severe and 10% as lesser. The incidence of incontinence is higher in severely subnormal patients (39%) than in mildly subnormal patients (11%). 65% of severely subnormal children are severely incontinent and 13% incontinent to a lesser degree; 22% of severely subnormal adults are severely incontinent and 12% so to a lesser degree. (The complete set of statistics is included in Table 1). Assessment of patients' incontinence and its degree involved rating on several aspects. Broadly speaking, 'severe incontinence' refers to frequent wetting and soiling during the day and night; 'incontinence to a lesser degree' involves occasional diurnal enuresis and occasional or frequent nocturnal incontinence; 'continent' refers to absence of encopresis and absence or infrequency of enuresis.

Morris (1969) classifies incontinence as 'severe' (i.e. daily and doubly incontinent) or 'moderate (i.e. only occasional wetting and soiling). In the sample of 362 children, 50.5% were

described as severely incontinent and 23.7% as moderately so. 12.4% of 2,676 adult patients were found to be severely incontinent and 13.2% to be moderately incontinent. The prevalence of all incontinence is therefore 74.2% in the juvenile population and 25.6% in the adult population. These statistics can be seen to be highly similar to those from the Census (76% and 26% respectively). Morris notes the discrepancy between her results and those obtained in a Birmingham Survey in which 61% of children and 12% and 18% of female and adult males respectively were found to be incontinent. Morris suggests that the different definitions of incontinence used may be responsible for the discrepancy. Smith, Britton, Johnson and Thomas (1975) express doubts about available statistics. They found from an inter-rater reliability study in which two nurses (both familiar with the patients) assessed rates of incontinence that overall agreement reached only about 50%. They caution that: "unreliability of nursing reports is no doubt one factor contributing to the variaties in reported incontinence rates between different surveys."

No empirical data exist from which the consequences of incontinence in mental deficiency can be ascertained. Morris (1969) notes: " .. incontinence is said by the staff to be a major problem since it involves them in a great deal of work of a somewhat unpleasant nature and puts very real pressure on the laundry service. It is also frequently mentioned as one reason why patients cannot wear their own clothing all the time .... Furthermore, in some wards ... nurses experienced considerable difficulty in getting rid of the smell of incontinence .."

Wagner and Paul (1970) state; "Incontinence tends to repel the staff who fall into the role of providing only custodial care, spending the major portion of their time cleaning up patients' excrements while expressing attitudes of discouragement and disgust for the individuals themselves." They suggest further that patients may be restricted from potentially therapeutic ward activities, avoided by off-ward staff and rejected for alternative forms of care. Levine and Elliott (1970) assert that "Attendants prefer not to work with profound

retardates since cleaning human excrement is unpleasant." Ellis (1963) comments that "One of the most degrading features of the care of such patients (severely defective) is associated with the absence of toilet habits."

Observations made by the researcher during pilot studies support such comments. It can only be concluded that incontinence is an undesirable incapacity associated with mental deficiency. For the patient it may limit interaction with normal persons; detract from the potential satisfactions of nurse-patient relationships; deny him access to therapeutic activities; and prevent discharge to alternative forms of care. For the nurses, incontinence results in an unpleasant and time-consuming task. For the hospital, incontinence causes laundry problems.

It has previously been noted that nurses have not attempted to any degree to alleviate the problem of incontinence through patient training (H.M.S.O., 1969; Morris, 1969). Willington (1975) summarises that " .. analysis of time spent by the nurses in managing incontinence shows that the major part is devoted to a cleaning operation, a smaller part to rehabilitation of the incontinent patient, and an even smaller part devoted to training nurses in this matter".

This general summary could pertain specifically to the position in mental deficiency nursing. It is encouraging that in a recent nursing book on mental deficiency, Kekstadt and Primrose (1973) emphasise that "toilet training is one of the very important aspects of nursing care."

The aetiology of incontinence associated with mental deficiency has not been studied specifically. The nature of the problem in the majority of cases would appear to concern primary incontinence and both enuresis and encopresis. Smith et al. (1975) state that: "we can distinguish two groups: those who are actually incontinent;

and those who, not strictly speaking incontinent, manifest toileting problems in a wider sense." Within the first group are included incontinence (i) of organic origin; (ii) resulting from inability to recognise need to eliminate; (iii) resulting from inability to respond appropriately to the need. The second group is said to be the larger and consists of patients who are dependent upon staff for toileting needs.

Aetiologies of mental deficiency were previously categorised broadly as those attributable to biological/organic causes and those to environmental/non-organic causes. Damage to the nervous system is said to be detectable in about two-thirds of all cases of severe mental handicap and in about one-third of all cases of mild mental handicap (O.H.E. 1973). There is therefore reason to suppose that the higher prevalence of incontinence in severely sub-normal patients may be at least partially related to the higher incidence of organic aetiology within this group. Kirman (1972) postulates that:

> " A high proportion of profoundly retarded children may always be doubly incontinent, as will some children in the severely retarded range, but it should be possible to teach mildly and moderately retarded children clean toilet habits."

The presence of incapacities associated with mental deficiency, such as a degree of immobility, or defects of sight, hearing and speech, may also be relevant to the aetiology of incontinence in mental defectives. The higher prevalence of these incapacities in the severely subnormal (see Table 1) again corresponds with the higher prevalence of incontinence in this group.

However, in the absence of knowledge about aetiologies of incontinence, the appropriate concern is to attempt to alleviate the problem through training. Evidence is available to demonstrate that behaviour modification toilet training has been found to be

effective for mental defectives, irrespective of aetiology and degree of deficiency.

## 2. Review of behaviour modification toilet training of mental defectives.

The influence of the study reported by Levine and Elliott, (1970) on the present research has been noted. The particular relevance of that study lies in its apparently successful application of behaviour modification toilet training to a large group (n = 103) of profoundly retarded incontinent patients by a nursing staff which was limited in number. The ratio of attendents to residents never exceeded 1:10. Patients ranged from 4 to 48 years in age and all had I.Q. under 25. The toilet training procedure involved toileting the patients at regular intervals, the technique of successive approximation being used. Training lasted for 10 weeks. Results indicate that the average rate of accidental defecations per week was reduced (by 59% from 22.8 to 9.4 per week) in each of the 5 cottages involved. Soiled linen was reduced by 41.68%. The report of this study is brief and lacks detail and discussion of the procedure, results and problems. Thus, it is difficult to appraise. It might be doubted that the results support the authors' claim that " 103 profound retardates were toilet trained." The average number of accidental defecations per week per cottage must be considered in relation to the number of residents per cottage, this being an average of 20.6 In this context, the baseline average of 22.8 accidental defecations per week seems low. The reduction by 59% is therefore not particularly dramatic. The absence of detail on single subjects does not permit inter-subject comparison. No mention is made of whether training included attention to urinary elimination as well as faecal. In these

respects, the report is of limited value, but the study itself remains interesting as an attempt to train a large group of patients.

Gardner (1971) notes that toileting is one of the more difficult self-care skills for mental defectives to master. He comments that:

> "... Some of the most creative and sophisticated applications of learning concepts have been illustrated by programs designed to teach toilet training skills ... (these) have provided rich information to guide the technician in a toilet training programme."

The importance of toilet training the mentally retarded is noted by Rentfrow and Rentfrow (1969), who suggest that operant techniques are especially appropriate for this population because they do not require verbal ability on the part of the retardate. These writers provide a review of literature related to toilet training of mental retardes, this including discussion of the presentation of a behavioural analysis of toilet behaviour by Ellis (1963) and description of seven subsequent studies. In summary of the results of these studies, Rentfrow and Rentfrow note that, while significant improvements in elimination control is usually achieved, regression may arise and explanation of success may lie in terms of the general improvements brought about by the studies. They note the effect of isolation from the wards during training and the use of mechanical reinforcement devices as enhancing results. In conclusion they state: "This review has indicated that toilet training programs utilizing behaviour modification principles can be effectively applied in the institutional setting. All of the studies reported some degree of success with a program, but the major difficulty was regression upon return to the standard ward. Here lies the problem for future research to investigate."

It is intended to review relevant studies within five sections and then to appraise these collectively in terms of commonalities, findings and limitations. In the first section a summary of the theoretical analysis of toilet training by Ellis (1963) is provided. This paper can be considered to be seminal to research on

behaviour modification toilet training. The second section deals with three studies (Dayan, 1964; Baumeister and Klosowski, 1965; Giles and Wolf, 1966) which exemplify early applications of the Ellis model. A review of a group of studies which, in various ways, provide some addition to the theory and practice of toilet training constitutes the third section. (Hundziak, Maurer and Watson. 1965; Bersberg, Cowell and Cassel, 1965; Kimbrell, Luckey, Barbuto and Love,1967; Lohman, Eyman and Lask, 1967; Watson, 1967). The fourth section is somewhat less cohesive. It provides an overview of a variety of studies related to toilet training of mental defectives. In the fifth section some of the most recent developments are reviewed, these being largely attributable to the work of N.H. Azrin, R.M. Foxx and colleagues.

In ensuing discussion, a variety of points are raised. Results are summarised in attempt to reach some conclusion about the achievements of studies to date. The definitions of 'toilet training' are discussed. The problem of regression is reviewed, as is the related question of the training environment. Characteristics of the patients involved in various studies are identified and compared. Techniques and procedures described are commented upon. The methodology of studies is identified and criticised. Finally, the involvement of nurses in behaviour modification toilet training is analysed and related nurse training discussed.

(1). Ellis (1963): A S-R Reinforcement Analysis:

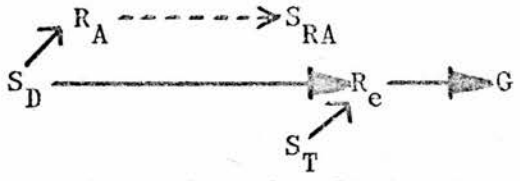
Ellis' paper is one of the earliest publications relating to the toilet training of mental defectives by behaviour modification techniques and it remains the major theoretical discussion of this subject, despite the subsequent reports of its application. The

paper provides a theoretical analysis of toilet behaviour based on a S-R reinforcement paradigm from which implications for a toilet training programme are deduced. (The symbols S and R refer to stimulus and response respectively and their linked presentation indicates an established association between them.)

In analysing toilet behaviour Ellis provides analysis of both the situation prior to training and that following training. In the pre-training situation he suggests that the elimination response ($R_e$) occurs in response to a discriminative stimulus ($S_D$) alone, this being the "tension in the bladder of visceral stimuli arising from the rectum". This situation is summarised schematically as follows:

$$S_D \longrightarrow R_e$$

The more complex situation following training is as follows:




This basically shows that the elimination response now occurs in response to a stimulus pattern consisting of the $S_D$ as well as other stimuli. These include an approach response ($R_A$), elicited by $S_D$, and cues generated by this approach to the toilet ($S_{RA}$); as well as cues more directly associated with the toilet ($S_T$), such as contact with the seat. The sumbol 'G', described as a goal stimulus, refers to the reduction of the unpleasant $S_D$. G therefore becomes the reinforcer immediately following $R_e$ and serves to strengthen the occurence of this elimination response which comes to depend on a context of cues.

Ellis continues by suggesting that; "from the preceding analysis it is evident that the teaching of toilet habits is defined by getting $R_e$ to occur in response to an appropriate context of cues rather than to the $S_D$ alone. Thus the initial task is to determine the temporal locus of $S_D$." Having determined the time when the elimination response occurs then allows the subject to be brought into the appropriate stimulus context, with the consequent occurence of $R_e$. In addition to the reinforcement provided by the reduction of discomfort (G) other reinforcers can be presented. It is this control over "environmental contingencies" which Ellis sees as being central to the process which is responsible for establishing the situation following training.

In detailing plans for a toilet training program based on this analysis, Ellis lists fifteen points which he considers to be important principles to which to adhere. Selection and training of staff are seen to be primary requisites. Patients should be between 12 and 35 years of age, mobile, without severe behaviour problems or severe physical disabilities. The requirement of an isolated and controlled training environment is stressed, this including the provision of a minimum and very regular diet. In accordance with the theoretical analysis of toilet behaviour Ellis asserts that "the success of the project would appear to hinge critically upon the accuracy of these records (of the frequency and time of $R_e$) for the provision of information pertaining to the temporal locus of $S_D$." The procedure of toilet training is then described as centering upon toileting patients according to their temporal pattern of elimination. Appropriate $R_e$ in the toilet can then be reinforced, and inappropriate $R_e$ (i.e. not in the toilet) not reinforced. Ellis suggests that these two distinct contingencies can be aided

by separate staff being allocated to each situation. The establishment of appropriate $R_e$ involves four stages. Ellis notes the eventual "weaning" from attendant assistance and the introduction of a schedule of "partial reinforcement". These techniques seem to be very similar to those more commonly described as 'fading' and 'intermittent reinforcement'. The procedure proposed is to be undertaken for a period of 90 days (including a 30 - day period of baseline recording) on a 7 - day week schedule.

Three other points included in the paper seem pertinent to note. The first is that training should centre on defecation as the $R_e$ since "it is likely to occur once or twice per day and to occur more orderly than urination .... and it seems likely that once it is brought under control through generalisation mechanisms, urination will be controlled similarly." The second point refers to the existence of $S_D$, and Ellis suggests that "these minimal cues such as holding genitals, crossing legs, etc. no doubt result mainly from toilet training and probably do not occur in the patient with whom we are concerned." Thirdly, Ellis looks at the reasons why toilet habits may be absent in a patient. He suggests four likely explanations:- (i) lack of training; (ii) decreased learning ability; (iii) Central nervous system damage which reduces the $S_D$ or effects of G; and (iv) C.N.S. damage which inhibits sphincter control.

Ellis concludes by noting that: " .. the problem is not in training the patient to use the toilet but to 'keep him trained'." He does not provide empirical evidence of the effectiveness of toilet training on the basis of the theoretical analyses. The assumption is that mental defectives can be trained and that analyses of behaviours are important as a basis for developing training programmes. In the

light of subsequent research, Ellis' theoretical analysis can be regarded as an important contribution, albeit an exploratory one.

(2) Three studies based on Ellis' theoretical analysis;

Many of the studies reported refer to Ellis' analysis and those of Dayan (1964), Baumeister and Klosowski, (1965) and Giles and Wolf (1966) are selected merely as examples of earlier work. The first two use Ellis as the singular reference. Giles and Wolf include evidence of a wider literature review from behaviour modification theory and research.

Dayan (1964) reports a toilet training programme for 25 incontinent patients between the ages of 6 and 12 years who showed "low adaptive behaviour levels" on the Gardner Behavior Rating Chart. The training procedure basically involved a regime of two-hourly toileting on a commode throughout the 24-hour day. Positive reinforcement was presented for appropriate elimination. Results are presented in terms of a substantial reduction in the amount of soiled linen used.

Baumeister and Klosowski (1965) describe an attempt to train 11 severely retarded patients in a group programme. The group was selected as representing the most profoundly retarded in the institution and on the basis of a high degree of predictability in elimination patterns. The average age was 17 years and 11 months and level of deficiency is stated in terms of an 'average I.Q. of 13'. The group isolated in a dormitory unit by day and stimulus conditions were consistently maintained. Four personnel were selected to share the responsibility of training. The procedure involved the toileting of patients on the basis of ascertained individual temporal patterns of elimination. Subsequently, the 'statistical' prediction was abandoned in favour of the 'clinical' when "the attendants were

able to select, by other indicators, when the patient was ready to defecate." Ellis' analysis was interpreted as: "the basic procedure simply involves the reinforcement of desirable behaviours and the non-reinforcement of undesirable behaviours." The training programme lasted 70 days. Results indicated an initial deterioration of patients' behaviour in the first few days. Then the frequency of appropriate behaviour increased. At the end of 20 days, 62.5% of defecation responses and 57.8% of urination responses occured in the toilet. This improvement continued until the 49th day. At this stage, provision was made for the patients to go out into the playground for a brief period daily. It is reported:

> "The effect was to practically erase the progress which had been made up to that point. The records show that most of the subjects quickly regressed to the pre-training level of performance."

It is concluded in the report that: "it appears that when the stimulus context is abruptly altered for these individuals, there is more regression than transfer." It is noted that "it is clear that toilet training involves much more than elimination when the subject is placed upon the commode." Some other aspects of patients' behaviour were noticed to improve (e.g., feeding), and the authors comment that "it does suggest that specialised training programs might positively affect several areas of development." Four points made in the discussion are noted:- (i) the importance of selecting and training staff appropriately (a staff: patient ratio of 1:6 is suggested); (ii) the relevance of pre-elimination behaviour (e.g. restlessness) to timing of toileting; (iii) the importance of maintaining during training a consistent set of stimulus events, although gradual introduction of changes to permit transfer of responding to the normal living unit; (iv) the necessity to determine the nature and timing of reinforcement.

Giles and Wolf (1966) note the absence of experimental work related to toilet training retarded children and suggest the relevance of operant conditioning to this skill in view of demonstrations of its effectiveness with other behaviours. They deviate from Ellis' recommendation that a controlled environment appears necessary and implement the programme with a selected group of five children in their usual institutional environment. The children were aged from 6 to 18, each having a low frequency of self-initiated toilet behaviour. Baseline data were used to determine the temporal pattern of the elimination response and to allow evaluation of the programme. Positive reinforcement was made contingent upon appropriate elimination. After this alone was not found to be adequately effective, punishment procedures were made to follow inappropriate elimination. Other techniques which contributed to the procedure involved extinction, behaviour shaping (for sitting, undressing and self-initiated toilet use) and stimulus generalisation. Bowel control was established before reinforcement for urinary elimination was introduced. Response generalisation was said to be evidenced by the ease with which urination came under the control of reinforcement. Other measures employed include the use of laxatives to increase the frequency of defecation and deprivation of food to increase reinforcer effectiveness. Cumulative records of response rates for individual subjects are presented. By the end of 8 weeks, all five Ss were eliminating consistently in the toilet.

The three studies described can be seen to illustrate the effective application of behaviour modification toilet training after the theoretical analysis of Ellis (1963). Bayan's study can be reviewed as a simplistic, but apparently successful, direct application of theory to practice. Its major limitation is in the evalu-

ation of behaviour change by a non-behavioural criterion (laundry). A more thorough and systematic approach is adopted by Baumeister and Klosowski. Some preliminary discussion is presented on the factors of regression, the relevance of pre-elimination responses and the occurence of concurrent improvement in other behaviours. Giles and Wolf present a detailed report of procedural aspects and a demonstration of training conducted in the normal environment using reinforcers commonly available there. Collectively, the studies illustrate the effectiveness of toilet training mental defectives by methods based on the operant conditioning model and on the S-R theoretical analysis of toilet behaviour provided by Ellis.

(3) Contributions to the development of theory and practice:

Studies collected within this section tended to assume the effectiveness of behaviour modification toilet training of mental defectives, and concentrated upon developing theory and practice in this context. The questions being asked are:-

(i) Is behaviour modification toilet training more effective than other methods?; (ii) what precisely are the techniques involved?; (iii) which patients are responsive to toilet training, and what are the significant variables?

Hundziak, Maurer and Watson (1965) and Kimbrell, Luckey, Barbuto and Love (1967) attempt to answer the first of these questions. Both studies aim to test the efficiency of operant conditioning toilet training over other methods and use experimental research design to this end. Hundziak et al. randomly assigned 29 severely retarded boys (aged 7 - 14 years) to 3 groups - 'operant conditioning', 'conventional' (routine toileting without contingent reinforcement) and 'control' (no organised routine). Kimbrell et al. selected 2 experimental groups (operant conditioning) and 2 control groups (conventional) from a group of 40 severely retarded girls (aged 5 - 18 years). In each

experiment, the operant conditioning/experimental groups were toilet trained roughly according to the procedure described by Ellis. (Kimbrell et al. included, in addition, procedures aimed to enrich the environment; Hundziak et al. used an automated reinforcement device). The hypothesis in both studies (that operant conditioning methods are superior to conventional methods of toilet training) is said to be upheld. It requires to be noted that strict control of dependent variables was not attempted in either study. The operant conditioning groups were maintained in separate living units and environmental variables cannot be excluded as contributing to the results. Selection of groups (random assignment in Hundziak et al.; selection by 4 criteria - C.A, race, length of hospitalisation, Vineland Social Maturity Scale Score - in Kimbrell et al.) appeared to result in matched groups, but the precision of selection procedures might be questioned. Hundziak et al. express doubts about the small number of subjects involved. Neither study included long-term follow-up or replication. The training periods lasted 27 days (Hundziak et al.) and 7 months (Kimbrell et al. ). In the former case, it was shown that acquired toilet habits transferred to the original living unit (although the observational period lasted only 3 days).

Thus, these two experimental studies can be seen to suggest that operant conditioning methods of toilet training seem to be superior to conventional methods. However, neither shows conclusively that this is so. What remains to be demonstrated is the precise nature of the variables within 'operant conditioning' and the direct effects of these.

The studies of Bensberg, Colwell and Cassell (1965) and Watson (1967) provide some further detail concerning the techniques involved in behaviour modification toilet training. Bensberg et al. report a pilot study using a combination of operant and classical conditioning (which they call 'behavior shaping'). In this, the general procedures of toilet

training previously described are developed to demonstrate the shaping of toilet behaviour as being a process involving positive reinforcement of successive approximations to that behaviour. This process is also discussed by Watson who outlines the techniques within operant conditioning methods which have been shown to be most effective in teaching self-help skills to retarded patients. Watson included amongst these 'reinforcement', 'successive approximation', 'chaining', 'stimulus control', 'extinction' and 'time-out'. These writers therefore provide an indication of the range of variables within behaviour modification toilet training. Bensberg et al. note that the idenfitication of these suggests the necessity for research to determine the direct effect of such individual procedures upon the acquisition of toilet behaviour. The study of Lohman, Eyman, and Lask (1967) focussed on the relationship of patient characteristics, rather than procedural techniques, to results of toilet training. A longitudinal study over a five-year period was conducted and the toilet training status of mentally retarded persons was evaluated. A sample of 90 patients was obtained from a population of over 3,000 by a stratified sampling procedure. Checks of ratings of toilet status were made and inconsistent ratings were shown to reflect actual changes in patients' status rather than an unreliable system of rating. It was concluded that "toilet training is a changing characteristic and highly related to patient ability and problems." Three further results were concluded from the study. Firstly, patients who are young on admission (about 6 years old), and have an I.Q. of 20 or more, will probably master toilet training skills within a period of up to 5 years even without intensive training. Secondly, patients who are older (15 - 20 years) on admission, and with an I.Q. of 10 - 20, are those who benefit most from intensive toilet training methods,

training being accelerated considerably by special methods (such as operant conditioning). Thirdly, the chances of success are small for those patients who have a very low I.Q. (under 10) or who display severe behaviour problems (such as aggression, self-destruction or withdrawal).

No subsequent studies have attempted to validate these findings.

(4) Miscellaneous toilet training studies:

The studies mentioned here are not directly relevant to the experimental study of the present research, but serve to provide an overview of other aspects of research related to toilet training of mental defectives.

Barrett (1969) reports a behaviour modification toilet training programme carried out in the home situation. It involved the adaptation of laboratory - developed tactics to bowel-train a $5\frac{1}{2}$ year-old brain-damaged, hyperactive child. The parents successfully eliminated encopresis and established toilet behaviour in the child within approximately one month. Other reports are available to demonstrate the ability of parents in behaviour modification and behaviour therapy treatments (e.g; Hawkins, Peterson, Schwied and Bijou, 1966). Barrett's demonstration of this in relation to toilet training of mental defectives must be considered as an important study.

Chemotherapy in toilet training has been reported to be successful. Smith and Gonzalez (1967) found that a significant decrease in the incidence of incontinence of mentally retarded boys was maintained for a period of 3 months after a 3-week period of medication (nortriptyline hydrochloride ). Drug therapy, as an adjunct to conditioning treatment of nocturnal enuresis in institutionalised retarded subjects, is reported also by Kennedy and Sloop (1968).

Despite the fact that methods of toilet training mental defectives have developed, to some extent, from study carried out on persons of normal intelligence, little research involving both populations has been reported. An exception is that of Mahoney, Van Wagenen and Meyerson (1971). A prompt and fade toilet training procedure was implemented with 3 normal children (18-21 months of age) and 5 retarded children (5-9 years of age). In both groups, the established toilet behaviour was generalised from the training unit to the home situation by the parents.

In addition to earlier studies described, other reports of the effectiveness of behaviour modification toilet training for institutionalised mental defectives are available. The range of applications can be seen in the contrast between a case report of an individual autistic child (Marshall, 1966) and a programme involving groups of profoundly retarded adults previously thought to be resistant to, or incapable of, change (Thomson, Grabowski, Errickson and Johnson; 1970).

(5.) Recent developments in toilet training:

Concurrent with the planning and development of the present research, some further studies in behaviour modification toilet training were published. These derive largely from the work of N.H. Azrin and colleagues. Two main trends dominate their work. One is the development of rapid methods of training; the other, the use of automated devices to aid training.

Azrin and Foxx (1971), in preface to their report of a rapid method of training for institutionalised retardates, note:

> "At present, no procedure of established effectiveness is available for producing and maintaining normal independent

toileting by institutionalised retardates."

Nine profoundly retarded male adults were selected for training. Their ages ranged from 20-62 years; I.Q's were less than 30; the length of hospitalisation ranged from 6-45 years. The intensive training procedure included positive reinforcement of correct toileting; artificial increase of urination frequency by fluid intake; 'overcorrection' for accidents; shaping of toilet skills; and the use of a 'wet-alarm pants apparatus' and a 'toilet signal arrangement'. Analyses of results included both between-group and within-subject evaluation. Daytime incontinence was reduced immediately by about 90% and, after a post-training maintenance period, to near zero. Initial results were obtained in a period of a median of four days per patient. In conclusion, the authors state that:

> " .. The distinctive feature of this training procedure was its consideration of proper toileting as a complex and lengthy chain of responses that includes social, physical and psychological stimuli and requires strong positive and negative operant consequences for its maintenance in that chain, rather than considering it as a simple associative muscular reflex to internal stimuli .... These results indicate that the present procedure is an effective rapid, enduring and administratively feasible solution to the problem of incontinence of the institutionalised retarded."

Details of the apparatuses used are described by Azrin, Bungle and O'Brien (1971). Both the pants-alarm apparatus and the toilet signal arrangement allow an immediate signal of the occurence of the elimination response. This aids the trainer in reacting immediately in the appropriate way. The apparatuses are developed from the designs of the pad and bell system (Mowrer and Mowrer, 1938) and the automated system described by Van Wagenen and Murdock (1966). Azrin et al. claim that their development is "simpler to design, more foolproof, and more economical." A trial of toilet training in which the apparatuses were used is reported. The incontinence of four profoundly retarded young girls was eliminated within 3days, although further training was required to consistently maintain continence.

The effective application of the rapid method of training to bedwetting in retarded patients is reported by Azrin, Sneed and Foxx (1973). (The use of the urine-alarm apparatus alone was found to be ineffective for retardates). The rapid procedure has been applied to normal children (Foxx and Azrin, 1973; Azrin, Sneed and Foxx, 1974) and found to be effective also. The latter paper (Azrin et al., 1974) includes comment upon the theoretical framework of conditioning using a urine-alarm procedure. It is suggested that this cannot be explained by reference to the classical conditioning model and the writers concur with the operant conditioning analysis forwarded by Turner et al. (1970).

The rapid, intensive and apparently effective procedure described in these studies suggests a radical alternative to those methods adopted in previous studies. It is interesting that the first published cross-validation of the rapid method derives from work undertaken in the U.K. Smith, Britton, Johnson and Thomas (1975) acknowledge that "the work of Azrin and Foxx (1971) emerges as the most outstanding (in the literature) in terms of methods and results." Their study involved 5 ambulant, profoundly retarded males. Ages range from 25-56; the social age equivalents on V.S.M.S. were approximately 18/12; and none could speak. Apart from minor modifications, training followed the Azrin and Foxx procedure. Within a 9-week period, the frequency of urinary incontinence was decreased by about 84%. Self-initiated toilet behaviour was increased and maintained. At the end of 30 weeks, four trainees had further improved and the other had relapsed slightly.

The only other U.K. study of toilet training published in recent years is that of Fewtrell (1973). This involved use of

behaviour modificational techniques with a group of severely retarded children in a ward situation. Evaluation of the effect of training was made according to a reduction in the weight of soiled linen over the 24 week period. Fewtrell notes:-

> " ... the gross reduction of incontinence has the obvious benefit of releasing more staff from the routine nappy-changing role, to one which could enable more time to be spent on other constructive child-orientated activiities."

## Discussion

Results of studies:

Almost without exception, the studies demonstrate that behaviour modification toilet training can be effective in reducing incontinence in mental defectives. The results therefore provide redress to the situation noted by Rentfrow and Rentfrow (1969) that "it has been an unfortunate assumption that these (retarded) children cannot learn elimination control."

Effectiveness has been measured in various ways. The measurement conventional to behaviour modification research (i.e. frequency of response) is used by Giles and Wolf (1966), for example, and cumulative records of response rates for individual subjects are presented. Baumeister and Klosowski (1965) and Levine and Elliott (1970) present results in terms of a reduction in the frequency of incontinent eliminations for the group of patients involved.

Other studies deviate from this conventional measurement by measuring effectiveness of training on another variable. For example, Bensberg et al. (1965) evaluate improvement in terms of social functioning (on V.S.M.S.), as do Kimbrell et al. (1967). Decrease in incontinence is considered to be reflected in a decrease in laundry use by Dayan (1964) and Fewtrell (1973). Levine and

Elliott (1970) and Fewtrell (1973) mention improvement in staff morale as a measure of success.

Few of the early studies report results in terms of acquisition of toilet behaviour by subjects. Azrin and Foxx (1971) and Smith et al. (1975) do include this dimension, however.

That behaviour modification methods are superior to conventional methods of toilet training is the main result of the studies by Hundziak et al. (1965) and Kimbrell et al. (1967).

Thus, results available are difficult to compare and contrast because various evaluative measures have been adopted. A variety of findings collectively suggest that behaviour modification toilet training can (i) decrease the frequency of incontinent eliminations; (ii) increase the frequency of elimination in the toilet; (iii) decrease laundry output; (iv) improve staff morale; (v) achieve better results than conventional (non-reinforcement) methods. What results have failed to show clearly is the precise effect of training on the toilet behaviour of the individual.

Definition of 'toilet training':

The above limitation of results seems to be related to the absence of explicit training objectives in the majority of studies. It appears that there is a clear division between those studies concerned with training for continence (Dayan, 1966; Baumeister and Klosowski, 1965; Hundziak et al., 1965; Kimbrell et al., 1967; Levine and Elliott, 1970), and those concerned with toilet training to establish continence and independent toilet behaviour (Bersberg et al., 1965; Giles and Wolf, 1966; Azrin and Foxx, 1971; Fewtrell, 1973; Smith et al., 1975). Those in the first group tend to adhere to the theoretical analysis of Ellis (1963) which is primarily concerned with the establishment of the elimination reponse. Bersberg et al. clearly

acknowledge the limitations of this approach:

> "At issue is not the matter of ..... curtailing the number of toilet accidents. Rather, the concern is to find a method to teach these individuals so that they will engage in basic self-help activities of their own."

Azrin and Foxx (1971) adopt a similar doctrine:

> " ... normal toileting is not simply a matter of learning to respond to bladder and bowel pressures by relaxing the sphincter but rather is a complex operant and social learning process."

Although a group of studies, as noted, has been concerned with toilet training rather than training for continence, no detailed measurement of the degree of acquisition of independent toilet behaviour by subjects is presented in results of training.

Regression:

Ellis (1963) explicated that "the problem is not in training the patient to use the toilet but to 'keep him trained'." Baumeister and Klosowski (1965), as previously detailed, described the regression of subjects to pre-training level of performance after a change of environment during training. A temporary ward transfer during Fewtrell's (1973)training programme was accompanied by a temporary period of regression (as indicated in a sudden increase of linen usage). Rentfrow and Rentfrow (1969) identify the potential problem of regression as a major subject for future research to investigate.

The extent of the problem and its causes cannot be appraised adequately due to the lack of long-term evaluation in the available studies. Giles and Wolf (1966) express concern about maintenance of improvement and attempted to increase the effects of stimulus generalisation by carrying out the training on the patients' own ward. Hundziak et al., (1965) claim that the ability of patients to use the commode transfered from the training unit to the original unit.

However, this claim is based on results of only 3 days' follow-up observation.

The most satisfactory long-term evaluation is that in Azrin and Foxx (1971). Follow-up was continued for up to 140 days in the post-training ward maintenance period. Improvements were shown to be enduring.

From the limited evidence available it can be concluded that regression may be a potential problem confounding long-term benefits from behaviour modification toilet training. Long-term follow-up evaluation is therefore a necessary inclusion in the design of future research.

Training environment:

The evidence of Baumeister and Klosowski (1965), Giles and Wolf (1966) and Fewtrell (1973) suggests that the problem of regression may be linked to the training environment used. The first and third authors point to a relationship between an abrupt change of environment and the onset of regression. The second author feels that regression may be less likely to follow if training is carried out under normal (i.e. uncontrolled) circumstances; and that reinforcing stimuli commonly available in the institutional environment should be used.

This contradicts the original recommendation (Ellis, 1963) that:

> "Ideally these patients would be housed separately .... In brief, the cottage environment should be constant, quiet and without conditions which excite the patient."

The studies of Dayan (1964), Giles and Wolf (1966), Levine and Elliott (1970), and Fewtrell (1973) were carried out in the patients' usual ward environment. Those of Baumeister and Klosowski (1965),

Hundziak, et al., (1965), Bensberg et al. (1965) and Kimbrell et al. (1967) used a seperate training environment in which stimulus conditions could be controlled. The absence of follow-up data again prevents conclusion to be drawn concerning the relevance of this dichotomy. Azrin and Foxx (1971) conducted the intensive training stage in a controlled situation. Regression did not occur on transfer back to the ward. A maintenance training programme was conducted in the ward.

The effects of uncontrolled and controlled training environments on short-term and long-term outcomes require to be investigated.

Patients:

The size of patient groups involved in studies ranges from 5 (Giles and Wolf, 1966) to 103 (Levine and Elliott, 1970). Patients are described as being severely or profoundly retarded; and I.Q.'s where noted, remain under or around 30 (e.g. Dayan, 1964; Giles and Wolf, 1966). The Vineland Social Maturity Scale was used by Hundziak et al. (1965), Bensberg et al. (1965) and Kimbrell et al. (1967) and social quotients shown to range from 8 - 33, 24 - 32 and 6 - 28 respectively. Very approximately, the patients involved in studies can be classified as low-grade mental defectives according to the terminology of the present research. It must be assumed that these patients suffered incapacities prevalent within this population as no detail is available of patient characteristics in most studies.

Both juvenile and adult patients have been involved, although the majority of studies reported concern children between the ages of 5 and 18. Adults comprise the subjects of the studies of Azrin and Foxx (1971) and Smith et al. (1975). Rentfrow and Rentfrow

(1969) comment that " .. though most of the research to be reported used children as the sample population, the results are generalizable to adult retardates or to severely regressed psychotic patients." Ellis (1963) indicates that subjects should be between 12 and 35 years of age. Male patients have predominated in the studies and only one deals with female patients in particular (Kimbrell et al., 1967).

Selection procedures are not documented in many studies, despite the evidence of the relationship of patient characteristics to toilet training status provided by Lohmann et al. (1967). "Those who are the most consistent with respect to the timing of their eliminative functions are probably the best risks" is the conclusion of Baumeister and Klosowski (1965). This supports Ellis' point that "patients showing highly erratic $R_e$ records should not be included...". Hundziak et al.,(1965) prefer to adopt the relevance of the concept of neuralmaturation (McGraw, 1940). They say that "The 'toilet readiness' depends essentially on the ability of the central nervous system to exert sphincter control."

No evidence is cited in reports of studies which suggests relationships between patient characteristics and outcomes of training.

Procedures and techniques:

In general, with the exception of the recent work of Azrin and Foxx, toilet training programmes have utilised reinforcement techniques within a procedural framework similar to, or based upon, that of Ellis (1963). The simplest of procedures is that of Dayan (1964) in which patients were placed on the commode at 2-hourly intervals and elimination therein was positively reinforced.

Giles and Wolf (1966) introduced various techniques, such as punishment, negative reinforcement, extinction, behaviour shaping and generalisation, in addition to positive reinforcement. Watson (1967) adds further the techniques of chaining, stimulus control and time-out to the list of those relevant to behaviour modification toilet training.

The presentation of positive reinforcement contingent upon elimination in the toilet and the non-reinforcement of incontinent elimination appear to be central in all procedures reported. In those which concentrate upon toilet training in addition to training for continence, the techniques of behaviour shaping, chaining, generalisation and prompt and fade are most commonly involved in addition (see: Giles and Wolf, 1966, for example). Automated apparatus is used by Giles and Wolf, 1966, Van Wagenen et al., 1969 and Azrin and Foxx, 1971.

Procedural detail sufficient to permit exact replication is available only from the work of Azrin and Foxx. Bersberg et al. (1965) note that the factor (s) responsible for the modification of toilet behaviour have not been isolated. Smith et al. (1975) clearly indicate the need for empirical evidence to be provided to show the causal relationships involved in toilet training; and to satisfactorily explain the theoretical framework of procedures described as deriving from the operant conditioning model.

Research designs:

The single-subject pre-post-test design is adopted in most studies (e.g.: Giles and Wolf, 1966) as the basic research design or in combination with a two-group design. The design of the controlled experiment is employed by Hundziak et al. (1965), Kimbrell et al. (1967) and Bensberg et al. (1965)

The criticisms of Watson (1967) and Gardner (1969) of the methodological inadequacies in behaviour modification research were previously noted. These can be justifiably applied to the particular subject of toilet training research. Gardner, in fact, identifies 3 toilet training studies (Giles and Wolf, 1966; Hundziak et al., 1965 and Kimbrell et al., 1967) as exemplifying the "finest studies" (within behaviour modification research relating to self-help skills.), but criticises them on account of being deficient in at least one of the requirements of good experimental design.

Nursing staff:

The involvement of nursing staff (or 'attendants') in the programmes reported is discussed only tangentially, if at all. Most of the studies have been conducted by psychologists. An exception is noted by Dayan (1964), the programme being reported was "initiated spontaneously by a charge attendant ... as a result of stimulation by conferences in connection with the Ellis model study." Improvement in the morale of staff has already been stated as a observation in some studies (Dayan, 1964; Levine and Elliott, 1970). The resulting change in staff role (from custodial to therapeutic) has been similarly noted as a result in the study by Fewtrell (1973).

Ellis (1963) mentioned the importance of careful selection and training of attendants:-

> "the selection should eliminate those unable to follow a procedure vigorously as well as those who as a result of intellectual factors are unable to appreciate the simplified procedures involved. Moreover, those selected should participate voluntarily and express interest in the project."

Baumeister and Klosowski (1965) support Ellis' concern in their comment:

" .. Some (nurses), however good their intentions, are simply

> not flexible enough to be effective in the new situation. Their attitude to the patient remains essentially the same as it was in the regular ward duties, where their function is usually, and primarily, custodial."

Although the same authors commend the observational skills of nurses (in identifying pre-elimination cues) Smith et al. (1975) highlight inconsistency and unreliability in reports of nurses' observations.

## Conclusions.

From a review of literature concerned with behaviour modification toilet training of mental defectives it appeared that, although a substantial body of knowledge and research evidence exists, several apparently central issues require clarification and further research. In conclusion, the major contributions and limitations of the literature are noted in summary below:-

1. Following the provision of a theoretical analysis of toilet behaviour within an operant conditioning framework (Ellis, 1963), a series of behaviour modification toilet training programmes have been conducted. These provide evidence to demonstrate that mental defectives (of the lowest ability and of all ages) can be toilet trained by behaviour modification techniques.
2. Two main approaches to toilet training have been devdoped. One concerns training for continence in which emphasis is placed upon habit training the patient to eliminate in the toilet. The other aims at the achievement of independent toileting and considers toilet training to concern the establishment of continence and acquisition of associated toilet behaviour. In general, studies have failed to be explicit in their objectives of training and in evaluating results by meas-

ures compatible with these objectives.

3. Various toilet training procedures have been developed in which positive reinforcement of appropriate elimination is the central technique. A range of behaviour modification techniques have been employed within studies reported. Causal relationships between variables within the procedures and outcomes of training have not been identified. Explanation of toilet training within the operant conditioning theoretical framework has not been satisfactorily provided.

4. The long-term effects of toilet training by behaviour modification require to be monitored and the potential problem of regression to be studied. A possible relationship between regression and the use of a highly controlled environment for training is suggested.

5. Some evidence is available suggesting relationships between patient characteristics and potential for, and outcomes of, training. Further evidence in this area would be useful. In particular, there is little information concerning the possible reasons for failure to respond to toilet training and the criteria to aid selection of patients for training.

6. Methodology of toilet training research contains some deficiencies and limitations. Specification of all relevant independent variables; proper sampling techniques; use of control procedures; proper assessment of the dependent variable; and evaluation of long-term gains are features required in good experimental design (Gardner, 1969).

7. The involvement of nurses in behaviour modification toilet training has not been detailed or investigated. Selection, training, function and role are aspects requiring study.

CHAPTER 5:

METHOD (I) -

Experimental Design and
Experimental Situation

## 1. Experimental Design

The need to obtain results which could be considered as valid and with generality has been noted as the main reason for the selection of experimental method as the method of choice. Although experimental method normally involves the testing of a specific hypothesis, or rejection of the null hypothesis (Treece and Treece, 1973), no hypothesis was formed in view of the broad aims and the exploratory nature of the study. The experimental design was evolved to meet three conditions:-

(i) to manipulate the experimental situation (and experimental group within it) by the introduction of a behaviour modification toilet training programme (this considered to be the independent variable);

(ii) to provide empirical evidence of the effects of this manipulation on specific variables (incontinent and continent elimination response frequencies and toilet behaviour) and to identify any causal relationship of effects by control of the experiment;

(iii) to introduce replication of the experiment from which the validity and generality of results could be evaluated.

In these respects, the present experiment meets the three general conditions of experimentation identified by Meyers and Grossen (1974):-

"1. The experimenter must manipulate (vary, systematically change) some feature of the situation.

2. This manipulation must be made under controlled conditions.

3. The experimenter must observe the effects of the manipulation, i.e. he must collect data."

As previously discussed, behaviour modification research

conventionally adopts experimental method. Single subject pre-post-test design, reversal technique, multiple baseline technique and group designs are the various experimental designs adopted. All require baseline data against which to compare the effect(s) of the experimental procedure. An important consideration in behavioural research is therefore the concept of baseline stability. Sidman (1960) defines a "stable" or "steady" state as "one in which the behaviour in question does not change its characteristics over a period of time." Sidman (p. 240) comments that: " a steady-state baseline obtained before instituting any experimental manipulations ... makes possible a relatively refined type of measurement of behavioral changes. It permits the effects of the manipulated variables to be evaluated with reference to the individual's own behavior".

The behaviour being modified in toilet training is that of toilet behaviour. This was considered in the present study to comprise the elimination response and related toilet skills. The main baseline in the research design consisted of measurements of the frequency of incontinent and continent elimination responses (urination and defaecation) and of presence (or absence) of toilet skills. The experimental procedure involved the application of the specified behaviour modification toilet training programme. The effects of this manipulation were measured according to the variables comprising the baseline state. In respect of individual subjects, the experimental design therefore complies with the single-subject pre-post-test design which is conventionally employed in behaviour modification research. Meyers and Grossen define this design as follows:

> " ... the pre-test is the control condition for the post-test with the same subject providing data in both the control and experimental conditions."

In view of the limitations of this design in behaviour modification research in the demonstration of a causal relationship between

the experimental procedure and its effects (Kiernan, 1973), the research design was extended to accomodate also a two-group experimental design. This is based on the controlled experiment (the 'classic experimental design': see Madge, 1965). It involves the matching of an experimental group with a control group. The independent variable is applied to the experimental group only and dependent variables are held constant in respect of both groups. Evaluation of the experimental effect is made by comparing the post-experimental status of the two groups on the same dependent variables. The advantage of a two-group design, based on the controlled experiment prototype, lies in the strength of the control condition provided by the control group.

In addition, when a duration of time elapses during the experimental period, control of changes over time which may occur independent of the experimental influence is provided. A two-group experimental design was adopted by Kiernan, Donoghue and Hawks (1971) in a ward-wide behaviour modification programme. They note that: "The purpose of the control group is ... to provide a control for the effects of normal hospital care and maturation during the time (of the Project) ...".

Control of dependent variables is an essential feature of experimental method. Experimentation undertaken in the clinical situation allows minimal control in comparison with that possible under laboratory conditions. Meyers and Grossen identify three methods of control of environmental variables:- 1. holding environmental variables constant; 2. incorporating environmental variables as independent variables; 3. randomization of environmental variables. (p 131). The first method is particularly relevant to an experimental situation not amenable to stimulus control conditions. The authors note that: " ... by holding these environmental variables constant we can usually assume that their

influence is equated across all subjects and all groups."

In the present study the most convenient way to achieve this method of control was to maintain both the experimental and the control group in the same experimental situation.

The research design of the present study is described as a two-group experimental design incorporating a set of single-subject experiments. Control of the experiment is provided by the control group, the maintenance of constant environmental variables across the two groups, and a pre-test (baseline) condition. The features of the experimental design are noted below and these are considered to meet the general conditions of experimentation, the requirements of control of variables, and the specific conditions required by the aims of the present study:-

1. the experimental influence comprises the behaviour modification toilet training procedure (this is the I.V.);

2. a two-group experimental design is adopted with the experimental and control groups matched according to specified criteria;

3. the experimental effect is evaluated in relation to specific dependent variables (minimally; response frequency of incontinent and continent eliminations and status of toilet behaviour);

4. the experiment is conducted in a representative ward situation, both groups being maintained in this one situation to meet the condition of control of environmental variables;

5. a single-subject experimental design (pre-post-test) is incorporated within the two-group design to permit evaluation of the experimental effect on individual subjects;

6. replication of the experiment is involved to allow validity and generality of results to be assessed.

With reference to the final point above, Sidman (1960) notes that "the soundest empirical test of the reliability of data is provided by replication." He continues:

> " ... The simplest replicative technique is the repetition of a given experiment by the same investigator. Direct replication may be accomplished either by performing the experiment again with new subjects or by making repeated observations on the same subjects under each of several experimental conditions."

The former technique seemed appropriate to the present study.

The control group in the initial experiment was an ideal 'new' group in being matched to the experimental group and available within the experimental situation. In addition, their involvement in the study other than in a control capacity was felt to be desirable on ethical grounds. However, no patients were available to form a control group for the replicative experiment. The design of this therefore involved a pre-post-test design which corresponds with an acceptable modification of the controlled experiment described as "the experiment in time" (Madge, 1965).

The two-group controlled experiment is referred to as Experiment I; and the single-group replication of this as Experiment II. Figure 4 summarises the experimental design of these experiments.

Data from which the effects of the manipulation could be observed and evaluated were collected in the three stages of each experiment - (i) pre-experimental; (ii) experimental; (iii) post-experimental. Four periods of data collection were involved throughout the study in addition to the 2 experimental phases. These are referred to as Assessments 1 - 4. (The reader is referred back to Figure 3 in which the sequence of the study is diagramatically presented). In accordance with the research design, data were collected in relation to individual patients and to the groups involved. Emphasis was placed on the collection of behavioural data, on the measurement of behavioural phenomena, and on the evaluation of behavioural changes in individual subjects.

Selection of dependent variables to be considered in the study

EXPERIMENT I

| | Pre-Test | Experiment | Post-Test. |
|---|---|---|---|
| Experimental Group (EI) | EI | EI | EI |
| Control Group (CI) | CI | | CI |

Experimental design: Combination of two-group controlled design and single-subject design.

EXPERIMENT II

| | Pre-Test | Experiment | Post-Test |
|---|---|---|---|
| Experimental Group (E II = CI) | EII | EII | EII |

Experimental design: Combination of modification of controlled group design and single-subject design.

Figure 4: Experimental design in Experiments I and II

was undertaken to meet three conditions:- (a) that they must be able to be identified; (b) that they must be amenable to description or measurement; (c) that they have a known or possible relationship with the independent variable. The following data were selected for collection during the study:-

1. data related to the behaviour to be modified (i.e. toilet behaviour):
   - (i) response frequency of continent and incontinent elimination responses (urination and defaecation);
   - (ii) 'toilet behaviour status' (i.e. presence or absence of specific toilet skills);
   - (iii) behaviour patterns associated with the elimination response.
2. data related to general behavioural functioning:
   - (i) self-help skills (in particular, mobility and dressing);
   - (ii) communication skills (language and response to language);
   - (iii) social skills;
   - (iv) occupational skills.
3. data related to the isolation of individual reinforcers.
4. data related to individual life history (age, sex, diagnosis, degree of deficiency, length of hospitalisation, associated incapacities).

Several methods of data collection were employed. Data related to toilet behaviour (see 1. above) were collected by the recording of response rates through systematic and structured observation and behavioural (functional) analysis. Gunzburg's Primary Progress Assessment Chart (P-PAC) was selected as a suitable method of collecting data related to general behavioural functioning (see 2. above). Isolation of appropriate individual reinforcers was undertaken by observation and testing. Data related to individual life history were extracted from hospital and ward records.

The essential experimental data derived from continuous recording of response rates of continent and incontinent urinations and defaecations. Sidman (1960, p. 295) summarises: "The traditional measure of a transition is the speed, or rate, of the behavioral change." In addition, the acquisition and establishment of behaviours associated with the elimination response were observed and monitored intermittently.

Peripheral to the collection of individual behavioural data, two other dependent variables were measured to contribute to an evaluation of the effectiveness of the experimental manipulation. The number of items of linen used due to incontinence (wet or soiled) was counted. Nurses' work activities were observed and recorded. Both measures were made pre-and post-experimentally only.

Details of the method and procedure of data collection are provided in the description of the experimental procedure.

## 2. Experimental Situation

The conditions required of a representative ward situation are earlier identified as a low nurse:patient ratio; a relatively large and typical patient population; inexperience of nurses in patient training; and absence of environmental advantages. One ward was required for the experimental situation. A juvenile ward was selected for several reasons. A larger amount of research evidence was available on toilet training of juvenile mental defectives. The prevalence of incontinence is higher in juvenile populations and younger patients appear to have greater potential for training (Ellis, 1963; Lohmann et al, 1967). In addition, the researcher felt more comfortable about undertaking the study with younger patients.

A population of low-grade mental defectives was selected because of the higher prevalence of incontinence and the absence of self-help

abilities. From a nursing point of view, low-grade defectives constitute the greater problem in training.

The selection of the particular ward which was adopted as the experimental situation was not scientifically made. Three mental deficiency hospitals were available within a feasible geographical area. One was small, fortunate in having a good level of staffing and active in rehabilitation of patients. Another was large and progressive in approach. Neither seemed to constitute a 'representative' situation. The third hospital appeared to be suitable on account of its large patient population and absence of patient training programmes. Thus, the Royal Scottish National Hospital at Larbert was selected as the location of the study. Permission to undertake the study there was obtained in the first instance from the Physician Superintendent. The Principal Nursing Officer was involved in the arrangements for the undertaking of the study.

Description of the hospital and the ward within it which constituted the experimental situation is provided to set the scene of the study.

The Hospital:

The Royal Scottish National Hospital, with 1325 beds, is the second largest of 24 mental deficiency hospitals in Scotland. It was opened in 1863, intended to extend provisions of the Home and School for Invalid and Imbecile Children, opened in Edinburgh by Dr. David Brodie some 8 years earlier. The original Institution eventually housed about 500 children. Following the Mental Deficiency and Lunacy (Scotland) Act of 1913, the need to provide care facilities for adult mental defectives was recognised. A Colony, a self-contained therapeutic community with a productive farm and active

workshops, was developed between the 1920's and late 1930's. In the following decade, plans were made to replace the storied block accomodation of the Old Institution housing the children. The building of self-contained villas developed and this complex now houses the hospital's juvenile population. At the present time, therefore, the R.S.N.H. comprises an adult hospital (the Colony) and a juvenile hospital (the Institution). These are more or less independent of each other, their locations being about one mile apart. In the hospital as a whole, there are roughly 800 male and 500 female patients. Patients are grouped into homeogenous ward units roughly on the basis of sex (adults), degree of mental deficiency and physical handicap.

The juvenile hospital consists of 8 self-contained villas of 50 - 60 beds. The villas are set in the spacious grounds of the original Institution (which is now the hospital's administrative centre). Recent upgrading of these 15-year old buildings has included their division into 2 smaller 25-bedded wards. Patients from all villas share the facilities available for schooling, occupation, recreation and entertainment.

The total juvenile population (up to 16 years of age) was 188 as at March 31st, 1975. Table 2 shows the breakdown of the population by age. A few of these 188 patients are housed, for particular reasons, in the adult hospital. Parts of the juvenile hospital house adults and there is, therefore, a wide age range there.

Table 2: R.S.N.H. Juvenile population by age (as at 31.3.75)

| Age (years) | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| n | 1 | 2 | 6 | 9 | 10 | 19 | 18 | 15 | 19 | 21 | 17 | 26 | 25 |

n = 188

Table 3: Assessment of self-help abilities of patients in R.S.N.H.
(Juvenile hospital population: as at April, 1974)

Age range of population: 4 - 83 years.

| Patients | Number | Percent. |
|---|---|---|
| Total | 519 | 100 |
| Male | 287 | 55 |
| Female | 232 | 45 |
| **Toilet** * | | |
| Fully trained | 319 | 62 |
| Indicate need for toilet | 59 | 11 |
| Use pot/toilet when taken | 21 | 4 |
| Incontinent during day | 120 | 23 |
| Incontinent at night | 180 | 35 |
| **Eating** | | |
| Use fork and knife | 267 | 51 |
| Use spoon only | 144 | 28 |
| Fed by staff | 108 | 21 |
| **Dressing** | | |
| Minimal assistance | 249 | 48 |
| Considerable assistance | 93 | 18 |
| No co-operation | 177 | 34 |
| **Mobility** | | |
| Move freely | 383 | 74 |
| Move with difficulty | 62 | 12 |
| Non-ambulant | 74 | 14 |

* N.B. Categories within 'Toilet' section are not mutually exclusive and therefore percentages do not total 100%

Table 4: Self-help abilities of patients in R.S.N.H. (Juvenile hospital population) by age groups. (as at April, 1974)

← % →

| | 'Young children' | 'Older children' | ' Adults' | Total population |
|---|---|---|---|---|
| Incontinent: during day | 62 | 3 | 12 | 23 |
| : during night | 67 | 35 | 16 | 35 |
| Require to be fed by staff | 62 | 4 | 7 | 21 |
| Require considerable or full assistance to dress. | 82 | 34 | 45 | 52 |
| Non-ambulant | 37 | 0 | 9 | 14 |

A survey was undertaken in April 1974 (Mason, 1974) within the juvenile hospital to obtain data on the incapacities and abilities of its population. Table 3 shows these in relation to self-help skills. 23% of the population (ages 4 - 83 years) were incontinent by day and 35% at night; 21% required to be fed by staff; 52% needed considerable or full assistance with dressing; and 14% were non-ambulant. Table 4 provides a breakdown by groups of wards according to those housing 'young children' (4 - 25 years), 'older children' (9 - 25 yrs) and 'adults' (14 - 83 yrs). This showed the prevalence of incapacities to be highest in the 'young children' age group. (These data are provided as illustration of the hospital context and it is not necessary to detail the method and classifications employed in the survey).

The R.S.N.H. has a G.N.C.-approved training school for student and pupil nurses undergoing mental deficiency nurse training. The nursing establishment is recruited mainly from the local community. In common with other similar institutions, it has experienced staff shortages and depends upon a high proportion of untrained staff (nursing assistants). There has been some increase in recruitment since the time of the commencement of the present study. This improved situation is shown in Table 5 which provides a breakdown of the nursing establishment by category of staff.

Table 5: R.S.N.H. Nursing establishment (as at 31.3.74)

| Category | Number |
|---|---|
| Trained nurses (R.N.M.D.) | 94 |
| Trained nurses (S.E.N.) | 65 |
| Nurses in training (student & pupil) | 45 |
| Untrained staff (nursing assistants) | 229 |
| Nurse tutors | 1 |
| Total: | 434 |

The nursing service within the hospital remains ward-based and, although there is increasing involvement of paramedical specialist staff in patient care, nursing care is not yet provided within a multidisciplinary team framework. Care of patients within the wards is a nursing responsibility, and other staff operate in off-ward specialist departments to undertake specific aspects of patient care. 80 of the juvenile patients attend the Junior Occupational centre which is run by 9 teachers; and 31 attend the school which is run by 4 teachers. There is one qualified physiotherapist (and one vacancy for another) and one dentist and dental assistant available to the total population. One part-time senior psychologist and one probationer-grade psychologist, and one social worker, provide psychological and social work services to the R.S.N.H. (from the Departments which service both the R.S.N.H. and the neighboring psychiatric hospital). As a result of this small complement of specialist staff, nurses require to provide care and treatment of a broad nature. Due to the problems of shortage of nursing staff and the small proportion of trained nurses, often this care and treatment is limited to a custodial approach rather than extended to a therapeutic approach which is being encouraged within the mental deficiency nursing service as a whole. The desirability of developing the nursing service along the therapeutic model is noted in a recent nursing textbook written by the R.S.N.H's Principal Nursing Officer and Physician Superintendent (Kekstadt and Primrose, 1973). However, at the time of the introduction of the present study to the hospital, the situation was one in which a conventional and conservative nursing service prevailed. While it is not relevant to discuss this situation in detail it is relevant to note this background to the experimental situation in which the study was conducted in view of developments in mental

deficiency nursing previous to, and concurrent with, the undertaking of the present study.

Lewis Ward - The Experimental Situation:

One of the eight wards within the juvenile hospital of the R.S.N.H., Lewis Ward is a single-storied self-contained villa, housing 52 patients.(*) These patients include males and females, and the majority are classified as low-grade mental defectives. Details of the patients and their characteristics are provided later.

The ward comprises a large day-room, a dining room, four dormitories, two sanitary annexes, and the usual domestic and nursing amenity requirements. A detailed plan of the ward lay-out is provided in Figure 5.

The day-room is the central section of the villa. On one side it opens out into the grounds through french windows and is, therefore, light and airy. At one end of the room is a play area with a fixed climbing frame and, in the same position at the other end, a divided-off area with mattressed flooring for epileptic and severely disabled patients to remain safely in seclusion. Armchairs are placed around the perimeter of the room and a television set is positioned at one end of the room. The walls are painted in a uniform pastel colour and the floor is covered with linoleum. The french windows have curtains, the room is lit with fluorescent lighting and is heated with space heaters. There is no luxury

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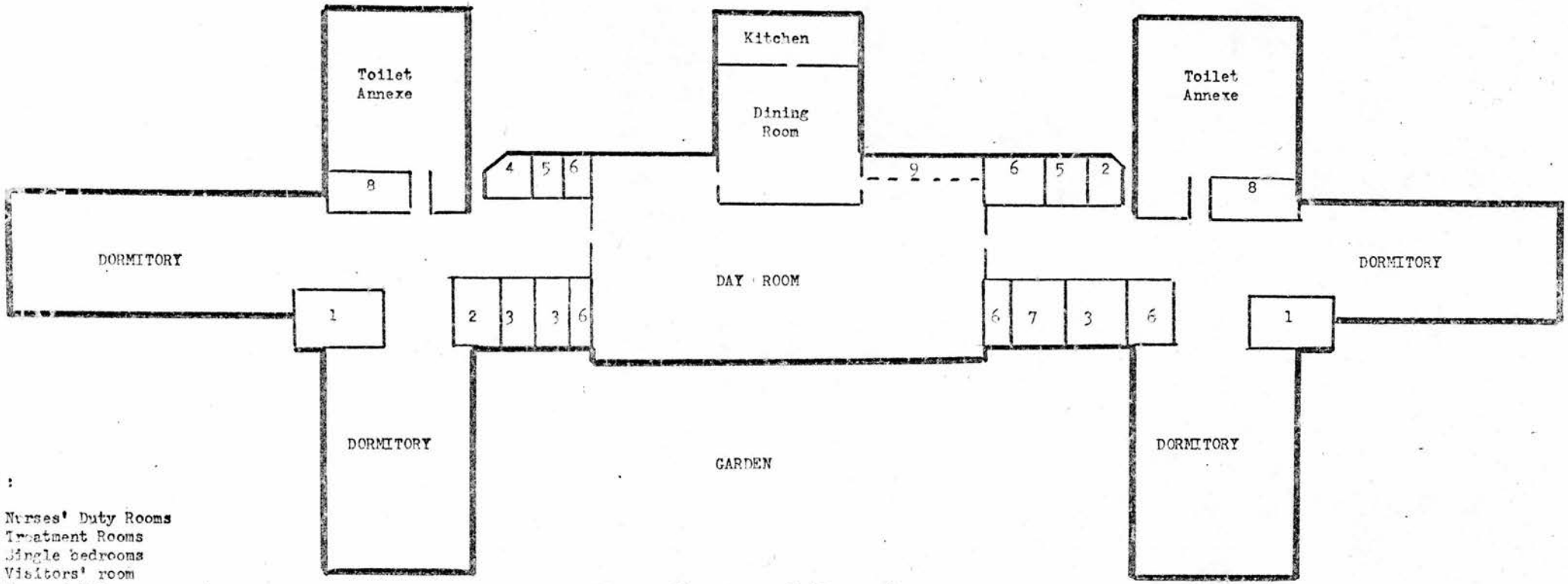
* Footnote:

Lewis Ward was divided into 2 wards (Lewis and Tiree) at the end of the period of the present study. The higher grade, younger patients were grouped together in Lewis ward; the lower-grade, older and more severely disabled patients were grouped together in Tiree Ward. The report of the study refers to Lewis Ward in its original state, i.e. prior to the division.




Key :

1. Nurses' Duty Rooms
2. Treatment Rooms
3. Single bedrooms
4. Visitors' room
5. Nurses' W.C.
6. Store rooms
7. Researcher's room
8. Sluices
9. Mattressed area

Figure 5 : Ground Plan of Lewis Ward (R.S.H.H.)

furniture, such as carpets or occasional tables, and no wall decoration. Some small toys are made available during the day, these being kept out of reach of the children at other times. The day-room can be divided into two sections by means of a room partition. Doors off the day room (one at each end to the dormitories and sanitary annexe and exterior, and two to the dining room) are kept locked, as are the french windows.

The four dormitories, two at each end of the villa, are each roughly the same size and are light, with windows on three sides; and are quite spacious. Standard hospital beds (many with cot sides) are positioned along the walls and divided by bedside lockers. The windows are curtained, and the beds covered with standard hospital bedspreads. There are no partitions, or curtains, between beds. The walls are painted similar to the day room and, likewise, the flooring is linoleum. Central lights provide the lighting, and space radiators the heating. There are no wall decorations or individual possessions to mark individual patients' beds.

The diningroom contains six small, low-height tables, each with four small chairs. There is a servery hatch through to the ward kitchen and access to the dining room for the patients is from the day-room. There is no individual tableware, other than spoons, and tables are not set for meals.

The two sanitary annexes, are at each end of the ward, each contain three W.C.'s, three wash-hand basins and two baths; and there is a sluice and dirty-linen closet adjoining. Open lockers, containing clothes for patients who require to be changed, are positioned in the annexes. The W.C.'s are partitioned with forward-opening, full-length doors; and the W.C.'s are of small height. There are no adaptations to W.C.'s or baths for handicapped

patients. There are inadequate facilities for cleaning and changing patients, a narrow bench being available for this purpose. The sanitary annexes have tiled walls and floors, with small windows set high up on one side. There is a reasonable amount of floor space and adequate, although not generous, space to manouvre a wheel chair to the W.C. There is a mirror set above one handbasin; and a water fountain in the annexe.

The domestic and nursing amenity requirements include a nurses' duty room at each end of the villa (each having two windows to allow observation of the dormitories); store rooms (for clothes and toys); two individual bedrooms (used for ill or disturbed patients); a visitors' room; a treatment room; and changing accomodation for nursing staff. On the whole, the patients living facilities and the other ward facilities are maintained in good decorative repair; are adequately lit, ventilated and heated; and provide all the essential requirements of a self-contained living unit. Swings and a round-about are erected in the ground immediately outside the front of the villa; and a fence denotes the garden pertaining to this villa.

From this description of the physical environment of Lewis Ward, it can be seen that, while the environment is in good order and contains the necessary facilities, it remains an institutional environment and there is a lack of environmental stimulation (such as bright colours, wall decoration and toys); provision for individuality (such as personal possessions, bed identification); and creation of a home environment. These features, or rather the lack of these features, were immediately apparent to the researcher on her first visit to the ward. This initial impression contrasted sharply with that gained on previous visits to some mental

deficiency hospitals in which wards had been dramatically upgraded on the model of the therapeutic community. The maintenance of locked doors is a practice contradictory to current trends. It should be noted that the doors within the ward are locked primarily to safeguard patients from environmental dangers. This is seen to be necessary due to the low-grade status of the patients and the impossibility of ensuring adequate supervision with the low nurse: patient ratio. The doors to the outside are kept locked for similar reasons, and a main railway line running behind the villa presents a real hazard. Thus, the practice of locking doors is recognised to be unsatisfactory, but agreed to be necessary in present circumstances. That the sanitary annexes therefore remained inaccessible to the patients from the day room presented a particular problem in the present study.

A brief note of life in Lewis Ward is appropriate in conclusion to the description of the experimental situation. No attempt was made to undertake a sociological study of life in the ward and any description is inevitably subjective. Life in Lewis Ward can be summarised as being dominated by a highly-structured routine which exists to ensure that patients' physical needs of food, elimination, clothing, medication and sleep are met. The nursing staff saw their function to be one of custody and care. Two comments made by nurses are quoted in illustration:

(i) " .... we are here to look after these kids who cannot be looked after by their families or can't look after themselves. So, we do for them what they can't do for themselves."

(ii) " ... We, as nurses, care for the patients - and we care about them. We feed them, wash them, change them, clothe them, get them out of bed and put them back to bed. We look after them in that we make sure we don't let them harm themselves or, when they are ill, we nurse them in the real sense of the word. When we have time, we remember that this is their home and try

not only to be nurses, but also parents to them. That means we play with them and try to have fun, like we do with our own kids . They're all individuals, you know - they all need the same basic things but, on top, they each need something a little bit special."

The daily routine follows a task-orientated schedule. The morning shift (starting at 7.00 a.m.) begins with the nurses getting the patients up out of bed. Those who have been incontinent are cleaned and changed on their beds, while a few are pottied beside their beds. They are dressed from the ward supply of clothes (which consists mainly of cat-suits for the younger and physically disabled patients; shorts or trousers for the boys and some of the girls; and dresses for other girls), an individual 'bundle' having been prepared the previous night. Once dressed, patients are carried or taken into the day room. Here, at about 8.30 a.m., breakfast is served. About a dozen of the patients (the group which attends school) have breakfast in the dining room, helped and supervised by a nurse or domestic. Meanwhile, the other patients are fed in turn by the nurses, either in an armchair or on the nurse's knee. The nurse in charge then does the medicine round from a medicine trolley brought into the dayroom while the school children are groomed and dressed and then walked over to the school, having been toileted in the sanitary annexe. During the remainder of the morning, the domestic work (bedmaking and cleaning) is carried out by the domestic staff, and one or two adult female patients from the Colony (and, sometimes, nursing assistants) are involved with bed-making and storing returned laundry. The patients who remain in the ward spend the morning in the day room. About six of these patients stay in the mattressed area where some toys are put and occasional observation ensured so that, for example, epileptic fits are dealt with. Of the remaining patients, some sit quietly in chairs, some lie around or move about the floor, others play with toys. The radio

is almost always on and there is always one nurse in the day room (sometimes two, but seldom three or more) with these forty or so patients. There is no structure to the nurses' activities at this time. Some attempt to play with patients in groups while others move between individual patients, talking and playing. Much of the nurses' time is taken up with dealing with episodes of incontinence (cleaning up the elimination and taking the patient out to the sanitary annexe to be cleaned and changed); dealing with minor incidents (such as petit mal epileptic fits, patients fighting, putting shoes back on); and dealing with patients disturbances (such as screaming, head-banging, breaking toys). Lunchtime is heralded by the noisy return of the schoolchildren and their preparation for lunch in the dining room. They are taken to the toilet after lunch and returned to the day-room, once the other patients have been fed. These patients are usually fed on a soft diet with a spoon from a bowl, few being able to spoon-feed themselves. Following lunch, they are taken individually to the sanitary annexe where their nappy is changed and clothes changed, if necessary. The morning shift staff are joined in this by the afternoon shift staff. The medicine round is done at this time.

The afternoon follows a very similar routine. In good weather, the patients are taken out to the garden where they sit or play with the nurses. They are joined at 3.00p.m. by the schoolchildren, who play on the swings and round-about or in the sandpit, until tea is served at about 4.30 p.m. The afternoon is also used for various activities, such as cleaning teeth, carrying out technical nursing procedures (for example, dressings or enemata) and, when staffing allows, a brief nursing staff meeting. Tea is conducted like the other two meals, but often with more disturbances as patients become

tired or fractious. Immediately after tea, the nurses start to bathe the patients and prepare them for bed. This activity spreads over the next 2 or 3 hours, the fifty-two patients being bathed by the three or four nurses on duty, who, during this time, each leave the ward for a half-hour meal break. Some of the older and physically disabled patients require two nurses to bathe them and put them to bed. While the schoolchildren wait to be bathed they usually sit round the television, sometimes provided with sweets or crisps. The dormitories are usually quiet by about 8.30 p.m. with lights out and patients settled. The last hour of the day shift is spent clearing up the ward and preparing patients' clothes for the next morning. Those patients who are pottied are lifted at the end of the shift. Most of the patients in nappies are changed at midnight by the night nurse.

A very similar routine is followed most of the time in Lewis Ward. Week-ends differ in that all of the patients are in the ward; those who have visitors are especially dressed to be taken out or into the hospital grounds; and a few patients might be taken to the Sunday service. Birthdays and festive occasions are celebrated with a tea party. Sometimes a few patients are taken on bus trips organised by the hospital. A group from the ward go to the Hospital's seaside home for two weeks in the summer. These deviations from the normal routine cause excitement and interest for the ward. Many routine events alter the schedule from day to day in addition. Visits are paid to the ward by administrative nursing staff and by medical staff, for example.

It can therefore be seen that life in Lewis Ward is dominated by a structured routine which is centred upon, and punctuated by, meeting the physical and basic needs of patients who are dependent

and incapacitated. When time permits, some nurses encourage informal nurse-patient interaction and recreation. The nurses tend to rely upon tasks as opportunities for interaction and there is, in this sense, a therapeutic side to their custody and care. In an unstructured and indeliberate way, nurses do sometimes encourage independent behaviour, are sometimes constructive in play, and frequently respond with appropriate positive reinforcement to patient behaviours. In this, there is,no doubt, modification of behaviour occuring. However, no attempt has been made to introduce any kind of systematic or explicit training of patients. There is no explicit planning of nursing care, no nursing assessment, and no evaluation of the outcomes of nursing intervention. There is minimal discussion amongst nurses about the needs of patients or their own role and function; and minimal communication between nurses and other professional staff involved with the patients. Particular details requiring nursing action are communicated at the charge nurse's report to each shift at change-over.

It is not possible to appraise whether the absence of planned nursing care and patient training in this ward was due to reasons given by the nurses (lack of staff, lack of time, limited potential of most patients) or to a lack of recognition on their part that patient training is important and possible.

Dubiety over whether criticism or commendation is appropriate in such a nursing situation is expressed well by Morris (1969) as her concluding comment:

> " .... There are many things wrong with our subnormality hospitals; conditions in some places are Dickensian and grotesque; in a few cases there is certainly unneccesary unkindness; but for the most part these patients are looked after by people who care, however misguided this form of treatment may be in the light of new knowledge about the possibilities of training the subnormal. The staff in the subnor-

mality hospitals badly need better instruction and guidance as well as more time to devote to fewer patients, but it should not be forgotten that in one important sense many of them accept those whom society chooses to reject."

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Footnote: The description of the experimental situation refers to the time at which the pre-experimental data collection period operated in the present study. It should be noted that many changes took place in relation to the physical environment, and the ward routine, towards the end of the period of the study and since its completion. These changes, all improvements to the environment and the care of the patients, were introduced for a variety of reasons and the present study can be considered as only one of these if, indeed, it is one. The description given here therefore does not apply to the present situation of Lewis Ward (i.e. Lewis and Tiree Wards.)

CHAPTER 6:

METHOD (II) - The Patients

The 'total population' of the present study is the patient population of the experimental situation (Lewis Ward). The 'research sample' is the patient group selected from the total population for the purposes of the experimental study. From the research sample was selected the 'experimental' and 'control groups'. A description of these various patient groups is presented and selection procedures described. The term 'patient' is preferred to that of 'subject' and is used throughout.

1. Total population:

At any point during the period of the study, the total population numbered 52. Code numbers were allocated from 01 - 52, by alphabetical order of surnames, to patients of the initial population. During the study (July, 1972 - December, 1973), 7 of these patients were transfered or discharged from the ward. 7 other patients were admitted and code numbers 53 - 59 were allocated in order of admission. Where reference is made to one individual patient the code number is used following 'P' (= patient).

Permission to involve the patients of Lewis Ward in the study was granted by the Physician Superintendent who assumed responsibility for their involvement and who closely supervised the research programme. Consent of parents was not sought as it was considered that the study constituted appropriate nursing treatment, did not involve aversive techniques, and did not present ethical issues. Parents who visited the ward were informed about the study by the Ward Sisters and/or the researcher. (Parental consent was subsequently sought in connection with the production of a Tape/Slide sequence.)

The description of the total population is provided within specific categories of patient characteristics thought to be relevant to the subject of study. Data related to these were obtained by abstraction from medical case notes, ward nursing notes and from the medical and nursing staff. The description refers to the total population at the beginning of the study (i.e. Ps 01-52 inclusive), as at July, 1972.

(i) Age: (see Table 6). The frequency distribution shows no regular pattern of distribution within the age range of 4 - 20 years, apart from a thinning off at the end values of the higher end of the distribution. There is no modal age. The mean age is 9.96 years and the median 9 years. Three patients lie outwith the classification of juvenile patients (i.e. up to 16 years.)

(ii) Sex: The total population is mixed. There are 40 male patients and 12 female patients. (see Table 7).

Table 6: Distribution of total population (N = 52) by age.

| Age | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $f$ no. of patients. | 1 | 3 | 7 | 6 | 7 | 6 | 3 | 3 | 1 | 2 | 6 | 3 | 1 | 0 | 0 | 1 | 2 |

N = 52

Mean age: 9.96 years

Median : 9.00 years

Table 7:
Total Population: Sex

| Sex | Number | Percent. |
|---|---|---|
| Male | 40 | 77 |
| Female | 12 | 23 |
| | N = 52 | 100 |

(iii) Diagnosis: The formal diagnosis of all 52 patients is stated as 'Mental Deficiency'. 23 patients are unclassified cases of amentia, while a known cause is stated for the remaining 29 patients. Table 8 provides information concerning the classification of amentia in this group of 29 patients. The single diagnostic category containing the highest number of patients is that of Mongolism.

(iv) Epilepsy: 24 patients (approximately 50% of the total population) are diagnosed as suffering from epilepsy (this including grand mal and petit mal epilepsy).

(v) Degree of mental deficiency: The classification used is previously discussed and synonymous terminology identified. Table 9 details the distribution of patients within the three grades. The grades are obtained from the medical case notes containing the formal diagnosis and assessment on admission. Only seven patients have been formally psychologically tested (six on the Vineland Social Maturity Scale and one on the Standford Binet Intelligence Scale) and, therefore, the allocation of grades is made without reference to an ascertained I.Q. It is seen that only one patient is considered to be high-grade. The majority (67.3%) are low-grade and the remainder medium-grade (30.8%)

Table 8: Classification and Diagnostic Category of Known Cases of Amentia (N = 30) within the Total Population (N = 52) : Classification after Heaton-Ward.

| Classification Category | Sub-Category | Diagnostic Category | Code Numbers. | Number of Patients |
|---|---|---|---|---|
| A Cases of amentia with known genetic abnormalities | Affecting Chromosomes | 1. Mongolism | 03,05,10,28,30, 35,43,46,48,50 | 10 |
| | Affecting genes | 2. Microcephaly | 32 | 1 |
| | | 3. Tuberous Sclerosis (Epiloia) | 18, 25, 26 | 3 |
| | | 4. Phenylketonuria | 39 | 1 |
| | | 5. Klippel - Feil syndrome | 20 | 1 |
| B Cases of amentia with no known genetic causes. | Nutritional amentia | 6. Cerebral Anoxia | 01, 29, 49, 51 | 4 |
| | Maternal infections | 7. Rubella | 19 | 1 |
| | | 8. Toxoplasmosis | 06 | 1 |
| | Childhood infections | 9. Encephalitis | 24, 36, 45 | 3 |
| | | 10. Meningitis | 13, 31 | 2 |
| | Trauma | 11. Kernicterus | 42 | 1 |
| | Other | 12. Congenital Absence of ears. | 47 | 1 |
| | | | | n = 29 |

Table 9: Distribution of the total population by Degree of Mental Deficiency

| Degree of Mental Deficiency | Number of Patients | Percent. |
|---|---|---|
| High-Grade | 1 | 1.9 |
| Medium-Grade | 16 | 30.8 |
| Low-Grade | 35 | 67.3 |
| | N = 52 | 100.00 |

Table 10: Distribution of the total population by length of hospitalisation

| Time category | Length time since admission (years) | Number of patients | Percent. |
|---|---|---|---|
| 0 | 0 - 1 | 5 | 9 |
| 1 | 2 - 4 | 16 | 30 |
| 2 | 5 | 16 | 30 |
| 3 | 6 - 9 | 12 | 23 |
| 4 | 10 and over | 3 | 5 |
| | | N = 52 | (98) |

(vi) Length of Hospitalisation: Table 10 shows the distribution of the total population by length of hospitalisation according to five time categories. 9% of the population have been admitted to hospital within one year of the start of the present study; 60% of the population have been hospitalised for between 2 and 5 years (inclusive); and 28% for 6 years and over. The calculations refer to the patients' first admission to R.S.N.H. In most cases this concides with their first admission to Lewis Ward and their first ever admission to a mental deficiency hospital on a long-term basis. The mean length of hospitalisation is 5.1 years and the median 5 years.

(vii) Prevalence of physical incapacity (paralysis) and sensory deficiency (blindness and deafness): Exactly 50% of the total population are handicapped by one or other of these incapacities associated with mental deficiency. Table 11 shows that physical incapacity is the more common handicap, occuring in 38.5% of the population. Some degree of sensory handicap occurs in 11.5% of the population.

The term 'paralysis' includes both flaccid and spastic types, (the latter being more common) and also athetoid type. 'Mild paralysis' refers to those cases where diplegia or non-severe quadriplegia is involved, resulting in some loss of movement. 'Severe paralysis' refers to those cases of severe quadriplegia in which movement is grossly impaired, or the spasticity is severe. (This classification is necessarily a loose one).

The 6 cases of sensory deficiency are those formally diagnosed as such. In addition, there is a further number of patients (about 6) in which sensory deficiency is suspected.

50% (n = 26) of the population suffers no distinguishable physical

Table 11: Prevalence of physical incapacity and sensory deficiency in the total population.

| Incapacity/deficiency | Number of Patients | Percent |
|---|---|---|
| Physical incapacity due to:- | | |
| Mild paralysis | 12 | |
| Severe paralysis | 8 | |
| All cases | 20 | 38.5 |
| Sensory deficiency due to:- | | |
| Partial blindness | 2 | |
| Total blindness | 3 | |
| Total deafness | 1 | |
| All cases | 6 | 11.5 |

incapacity or sensory deficiency.

(viii) Prevalence of behavioural incapacities: These incapacities refer to basic behaviours of mobility, eating, dressing, toileting and verbal communication. Table 12 shows the prevalence of each incapacity within the total population. 44.2% of the population have some degree of immobility and 69.2% are non-verbal. There is a high prevalence of incapacity in relation to the self-help skills of eating, dressing and toileting. 84.6% were unable to self-feed; 90.3% were unable to self-dress; and 76.9% were not toilet trained (i.e. incontinent) at assessment. By deduction, about 56% were mobile, 15% were able to feed self; 10% were able to dress self; 23% were

Table 12: Prevalence of behavioural incapacities within the total population

| Behavioural incapacity | Number of patients (N = 52) | Percent |
|---|---|---|
| Mobility:* | | |
| Limited mobility | 17 | |
| Completely immobile | 6 | |
| All cases | 23 | 44.2 |
| Eating: | | |
| Unable to feed self | 44 | 84.6 |
| Dressing: | | |
| Unable to dress self | 47 | 90.3 |
| Toileting: | | |
| Not toilet trained/ incontinent | 40 | 76.9 |
| Communication: | | |
| Does not speak | 36 | 69.2 |

* Note: Limited mobility = Unable to walk, but able to move by crawling or sliding.

Completely immobile = unable to walk, crawl, or slide.

continent or toilet trained; and 30% able to speak (i.e. one clear word or more).

(ix) Incontinence and toilet training: Table 13 indicates that 23.1% of the population were continent or toilet trained and 76.9% were incontinent or not toilet trained. Initial inquiry of the toileting status of the total population revealed three distinct groups of patients according to a nursing staff categorisation. One group (those referred to as 23.1% continent or toilet trained) was regularly toileted, had a minimal incidence of incontinence (day or night/urine and faeces) and was considered by the staff to be "toilet trained". A second group consisted of those patients who were being "potty trained." These patients were kept out of nappies during the day and pottied regularly at $1\frac{1}{2}$ - 2 hourly intervals. There was a relatively high incidence of incontinence (urinary and faeces) during the day, and the patients were incontinent at night and, therefore, maintained in nappies. The third group of patients comprised those who remained doubly incontinent day and night. They were maintained in nappies at all times, and were never toileted. On the whole this group was considered to be without potential for training in toilet behaviour. The distribution of the total population in relation to toilet status (according to these 3 groups) is shown in Table 13.

Tables 13 (i) - 13 (vii), show the distribution of the specific categories of patient characteristics, previously discussed in terms of the total population, within these three groups of patients. This analysis indicates some interesting differences between these groups in respect of the majority of characteristics. The differences in sex distribution (see Table 13 (i)) are not particularly relevant, although it is interesting that the ratio of males: females is 1:1 in Group I/

compared

with the overall ratio of 10:3. There is an indistinguishable difference in respect of the length of hospitalisation between that of the total population and Groups 1 and 3 in terms of the mean and median lengths. The mean and median of Group 2 are, however, lower than those of the total population (by approximately 2 years). Table 13 (iii) also shows that, while Group 1 spreads across the range of length of hospitalisation with high numbers of patients in the 2 - 4 and 6 - 9 year ranges, Group 2 turns off towards the higher end values (with only 16% at 6 years or more); and Group 3 has fewer patients of a shorter length of hospitalisation (with 81% of patients at 5 years or more).

In respect of the remaining characteristics, Group 3 differs markedly from the other two Groups. The mean age of Group 3 is 12.7 years, some 3 years older than the mean age of the total population (9.96 years). This contrasts with Group 1 in which the mean age of the total population is reflected, and Group 2 in which there is the lowest mean age (7.3 years). Group 2 also shows a range of age narrowerthan that of the total population (5 - 10 years as compared with 4 - 20 years). These figures are provided in Table 13 (ii).

Table 13 (iv) shows the distribution of the total population by degree of mental deficiency according to the toilet status grouping. Here is can be seen that, while Groups 1 and 2 contain slightly more medium-grade than low-grade patients, Group 3 contains a high proportion (roughly 90%) of low-grade patients. 71% of all low-grade patients within the total population are contained in this third group.

Similarly, as Table 13 (v) indicates, there is the highest proportion of epileptic patients within Group 3. 70.8% of all

Table 13: Distribution of the total population in relation to toilet status (according to nursing staff categorisation)

| Toilet status | Group | No. of patients (N = 52) | Percent. |
|---|---|---|---|
| Toilet trained/ continent by day and night. | 1 "Toilet trained" | 12 | 23.1 |
| Regularly pottied and semi-continent by day/ incontinent by night. | 2 "Being potty trained" | 12 | 23.1 |
| Doubly incontinent day and night; in nappies. | 3 "Incontinent/ untrainable" | 28 | 53.8 |
| | | 52 | 100 |

Table 13 (i) Distribution of total population by SEX according to toilet status grouping

| | Male | Female | Total |
|---|---|---|---|
| Group 1 | 6 | 6 | 12 |
| Group 2 | 11 | 1 | 12 |
| Group 3 | 23 | 5 | 28 |
| Total population: | 40 | 12 | n = 52 |

Table 13 (ii) Comparison of mean and median AGE of three groups according to toilet status with that of total population

| | Age Range | Mean Age | Median Age | N |
|---|---|---|---|---|
| Group 1 | 5 - 20 | 9 | 8.5 | 12 |
| Group 2 | 5 - 10 | 7.3 | 7.5 | 12 |
| Group 3 | 4 - 20 | 12.7 | 11.5 | 28 |
| Total population: | 4 - 20 | 9.96 | 9 | 52 |

Table 13 (iii) Length of hospitalisation in three groups according to toilet status

| Group | | Length of Hospitalisation (years) 0 - 1 | 2 - 4 | 5 | 6 - 9 | 10+ | N % | Mean Length | Median |
|---|---|---|---|---|---|---|---|---|---|
| Group 1 | n | 1 | 6 | 0 | 4 | 1 | 12 | 5.2 | 4 |
| | % | 8 | 50 | 0 | 33 | 8 | (99) | | |
| Group 2 | n | 4 | 5 | 1 | 2 | 0 | 12 | 3.2 | 3.5 |
| | % | 33 | 41 | 8 | 16 | 0 | (98) | | |
| Group 3 | n | 0 | 5 | 15 | 6 | 2 | 28 | 5.7 | 5 |
| | % | 0 | 17 | 53 | 21 | 7 | (98) | | |
| Total Population | n | 5 | 16 | 16 | 12 | 3 | 52 | 5.1 | 5 |
| | % | 9 | 30 | 30 | 23 | 5 | (98) | | |

Table 13 (iv) Distribution of total population by DEGREE OF MENTAL DEFICIENCY according to toilet status grouping

| Group | | Degree of Mental deficiency ← High Grade | Medium Grade | Low Grade → | N |
|---|---|---|---|---|---|
| Group 1 | N | 1 | 6 | 5 | 12 |
| | % | 8 | 50 | 41 | (99) |
| Group 2 | N | 0 | 7 | 5 | 12 |
| | % | 0 | 58 | 41 | (99) |
| Group 3 | N | 0 | 3 | 25 | 28 |
| | % | 0 | 10 | 89 | (99) |
| Total Population | N | 1 | 16 | 35 | 52 |
| | % | 1 | 30 | 67 | (98) |

Table 13 (v) Number of Epileptics in three groups according to toilet status

| Group | Number of Epileptics | Percent. |
|---|---|---|
| 1 (N = 12) | 4 | 33.3 |
| 2 (N = 12) | 3 | 25.0 |
| 3 (N = 28) | 17 | 70.8 |
| | TOTAL = 24 | |

Table 13 (vi): Number of patients with incapacity of MOBILITY in three groups according to toilet status

| Group | | Incapacity of Mobility: Limited Mobility | Incapacity of Mobility: Completely Immobile | N % |
|---|---|---|---|---|
| Group 1 | N | 3 | 0 | 4 |
| | % | - | - | 33.3 |
| Group 2 | N | 2 | 0 | 2 |
| | % | - | - | 16.6 |
| Group 3 | N | 12 | 6 | 18 |
| | % | - | - | 64.3 |
| Total Population | N | 17 | 6 | 23 |
| | % | - | - | 44.2 |

Table 13 (vii): Prevalence of behavioural incapacities (eating, dressing, communication) within the total population according to toilet status grouping.

| Group | | Behavioural Incapacities: Unable to Feed Self | Unable to Dress self | Does not speak |
|---|---|---|---|---|
| Group 1 | N | 6 | 7 | 4 |
| | % | 50.0 | 58.3 | 33.3 |
| Group 2 | N | 10 | 12 | 9 |
| | % | 83.3 | 100.0 | 75.0 |
| Group 3 | N | 28 | 28 | 23 |
| | % | 100.0 | 100.0 | 82.1 |
| Total Population | N | 44 | 47 | 36 |
| | % | 84.6 | 90.3 | 69.2 |

patients within Group 3 are epileptic as compared with 33.3% in Group 1 and 25% in Group 2.

The numbers of patients with incapacity of mobility in each of the three groups are shown in Table 13 (vi). 44.2% of the total population has some degree of immobility. Groups 1 and 2 have proportionately fewer patients with such incapacity (33.3% and 16.6% respectively); Group 3 has proportionately more (64.3%). All of the 6 patients within the total population who are classified as 'completely immobile' are contained in Group 3.

As Table 13 (vii) indicates, the prevalence of behavioural incapacities is lowest in Group 1 and highest in Group 3. The proportions of patients in Group 2 who are unable to self-feed and who do not speak are roughly similar to those of the total population. However, 100% of this group (2) are unable to self-dress, as in Group 3. 100% of patients in Group 3 are unable to self-feed or to self-dress; and 82.1% does not speak. This shows a very high prevalence of behavioural incapacities within this group.

The analysis of patient characterists within the total population in terms of the three groups related to toilet status, provides a rough profile of three distinct groups within Lewis Ward. Group 1, containing 12 patients considered by the nursing staff to be "toilet trained", has an equal distribution of sexes; is similar in respect of age to the total population; and has an equal mean length of hospitalisation; contains roughly equal numbers of medium and low-grade patients; contains small numbers of epileptics and patients with incapacity of mobility; and has a prevalence of behavioural incapacities about half that of the total population. Group 2, containing 12 patients currently being "potty trained", differs from the total population and the other two groups in having a smaller proportion of

females; a shorter age range and lower mean and median ages; and more patients with a shorter length of hospitalisation. The proportions of medium and low-grade patients, epileptic patients and patients with incapacity of mobility are roughly similar to those of Group 1. There is however, greater similarity of Group 2 with Group 3 in respect of behavioural incapacities with the proportion of patients unable to self-dress or to speak being higher than that of the total population, but with a similarity in the proportion unable to self-feed. Group 3, containing 28 patients who remain "incontinent and untrained", shows the highest prevalence of incapacities associated with mental deficiency (epilepsy, incapacity of mobility, behavioural incapacities); and contains the highest proportion of low-grade patients. The mean age of this group is higher than that of the other two groups and of the total population. There is a slightly higher mean length of hospitalisation, fewer patients more recently admitted, and the majority of the group (81%) with a length of hospitalisation of 5 years or more (compared with 58% in the total population, 41% in Group 1 and 24% in Group 2).

Changes in the total population: As was mentioned earlier, during the total period of the study seven of the initial total population (patients 1 - 52) were transferred or discharged and seven other patients admitted. Note is here made of these changes. P. 46 was discharged on the 15th day of Assessment I; and P 53 admitted on the 18th day. P 47 was transferred to another ward during Experiment I; and P 54 admitted in his place. P 01 was transferred to another mental deficiency hospital nearer his parental home following Assessment II; and P 55 admitted. At the same time P 09 was transferred; and P 56 admitted. After Experiment II, P 34 was transferred; and P 57 admitted. P 43 was transferred to the hospital ward due to ill-

ness and his place later filled by P 58 after Assessment 2. At Assessment 3, P 48 was transferred and P 59 admitted. There were no further changes in population between Assessment 3 and the completion of the study at Assessment 4.

It was not felt desirable to alter the current policy regarding admission to, and discharge or transfer from, Lewis Ward during the period of the study. However, it was agreed with the Physician Superintendent that those patients selected as research subjects should be maintained in the ward during this period, unless exceptional circumstances mitigated against this. With the exception of one patient (P 01) this practice was achieved. The changes referred to above therefore refer to patients not involved in the study as research subjects (with this one exception). It is the total population rather than the research sample of that, which is subsequently affected by changes.

2. Selection of the research sample:

One factor determined the selection of patients from the total population to the research sample. This was simply the absence of continence and toilet behaviour. This factor was present in all patients in Groups 2 and 3 on the basis of grouping according to toilet status. The 12 patients of Group 1 were excluded from the research sample. Of the remaining 40 patients, 4 were further excluded after discussion with the medical and nursing staff of the suitability of each patient for inclusion in the study. P 13, an 8 - year old male low-grade patient with a diagnosis of hydrocephalus, had been in the ward for three years. He was severely hyperkinetic, partially blind, unresponsive to simuli and felt to be too behaviourally disturbed to participate in a sustained training programme. P 33, a 4 - year old male low-grade patient, had only recently been admitted

to the ward. He is a severe epileptic and had suffered episodes of status epilepticus since admission. He was aggressive, disruptive and hyperactive and considered to be too young and too unmanageable to be involved in the programme. P 37, admitted five years previously, is male, low-grade, severely epileptic, severely spastic and confined to a wheelchair. Nursing staff considered him to be the most incapacitated and "hopeless" patient in the ward; and felt that his poor health and poor prospects should exclude him from the study. P 43 was a 10-year old male mongol of medium grade who was admitted six years previously. Despite the opinion that he would respond well to training, he was excluded on account of recurrent illness associated with cardiovascular and respiratory disease. This patient in fact became ill subsequently, was transferred to the Hospital Ward, and sadly, died there. Thus, omission from the research sample of 4 patients was determined by particular individual circumstances.

The research sample therefore consisted of 36 patients, each meeting 3 conditions:-

1. is a member of the total population;
2. is incontinent and deficient in toilet behaviour;
3. has no exceptional circumstances mitigating against inclusion in the research Sample.

Selection of patients in the research sample (n = 36) to two groups (experimental and control) was then undertaken.

For this purpose a systematic selection procedure which is conventionally adopted in a two-group experimental design was followed. This procedure is described by Madge (1965, pp 267 - 271) as the form of factor equation known as "precision control" which "entails a ... rigorous procedure by which the two samples are made up of matched individuals who have been paired according to the factors selected." Following this, randomisation is employed to ensure "that each pair

of individuals is assigned at random as between the two samples." The same procedure is discussed as "matching" by Meyers and Grossen (1974, pp 125 - 128). They note: "The use of subject variables as an independent variable is probaly the best control procedure to employ. If the effects of some of these variables are already known, or if it is for one reason or another not feasible to include subject variables as an independent variable, you may employ a control procedure known as matching. In the matching procedure, we attempt to equate subjects in each of the groups on one or more subject variables to provide comparable groups." Randomisation of paired individuals to the two groups is detailed as an integral part of this matching procedure. Within each description, problems inherent in this procedure are discussed. Madge notes that " in a single experiment the investigator has the choice of rather exact pairing by a large number of known characteristics or less exact pairing by fewer characteristics." He comments on the statement of Chapin (1947) that "attenuation is an inevitable consequence of precision control" (in the former case) and concludes in favour of the recommendation of Fisher (1949):- "while it is in the interests of the sensitiveness of the experiment that gross differences between the experimental subject and the control subject should be excluded, equalisation should be carried 'not as far as possible, but as far as is practically convenient.' It is highly probable that pairing on a small number of factors chosen for their relevance to the problem in hand, followed by

allotment at random to the two samples, would not only replace a statistically vulnerable test for significance by a statistically valid one, but could also provide a more sensitive experiment than any amount of unrandomised precision control."

Meyers and Grossen note four problems related to the matching procedure. These are:-

(i) the sometimes unknown relationship or correlation of the matched variables to the dependent variable;

(ii) difficulties inherent in pre-measuring subject variables;

(iii) inadvertant bias of response to the dependent variable as a result of pre-measuring; and, after Marascuile (1971);

(iv) the "regression fallacy";

The last refers to the phenomenon that "measures of characteristics are generally expected to regress toward the mean under certain measurement conditions." Consideration of these identified problems inherent in the matching procedure resulted in determining the required selection procedure in the present study. The procedure included the following steps:-

1. Identification of relevant subject variables;

2. Measurement of each subject in the research sample on the identified variables;

3. Pairing of subjects according to the ascertained measurements;

4. Assignment of paired individuals to two groups by randomisation;

5. Assignment of two groups, one as experimental and one as control, by randomisation.

(The first two steps were undertaken by the researcher during Assessment 1; the third and fourth steps were carried out by an independent assessor prior to Experiment 1; and the fifth step involved the researcher making a 'blind' selection, witnessed by the independent assessor.)

In defining the procedure and undertaking it in this way, the following conditions were being met as far as possible:

(1) Adopting a systematic, conventional and appropriate selection procedure to the research design;

(2) Equating subjects with respect to subject variables by matching (precision control) to improve the sensitiveness of the experiment;

(3) Equating groups with respect to subject variables by randomising pairs to improve the validity of the experiment;

(4) Reducing potential experiments bias and subjectivity by involving an independent assessor and 'blind' selection of groups.

It is recognised that an exact matching of groups in human experimentation can seldom be attained, and the above conditions merely serve to minimise any potential bias and not to exclude this.

In identification of subject variables (step 1), emphasis was laid on identifying variables which were both relevant and measurable. Three classes of subject variables and a total of 10 discrete variables were identified as being relevant to the initial pairing of patients in the selection procedure. The variables are enumerated in Table 14 and the method of measurement is noted.

Table 14: Subject Variables

| Class of Variable | Variable number | Description of variable | Measurement of variable. |
|---|---|---|---|
| (I) Demographic | 1. | Chronological Age (C.A.) | years |
| | 2. | Mental Age (M.A.) | months by Cattell Infant Intelligence Scale |
| | 3. | Sex | Male/Female |
| (II) Behavioural | 4. | Self-help ability | score of skills present in appropriate quadrant of Gunzburg's P - PAC |
| | 5. | Communication ability | |
| | 6. | Socialisation ability | |
| | 7. | Occupation ability | |
| (III) Relevant to independent variable | 8. | Toilet status | Group 2 - "being potty trained" Group 3 - "incontinent/untrainable |
| | 9. | Mobility | full/limited/immobile |
| | 10. | Sensory deficits | blindness/deafness. |

All 36 patients were assessed in relation to each of the 10 subject variables at Assessment 1. Within the description of the selected experimental and control groups, the pairs of patients obtained can be studied.

3. Description of the Experimental and Control Groups:

Tables 15 and 16 contain the measurement of patients in the experimental and control groups on the 10 subject variables. The 18 patients in each group are arranged in sequence according to the 18 pairs matched and randomly assigned to the two groups. (The sequence is not significant, but follows that used in presentation of results in keeping with the publication arising from the study). The pair numbers (1-18) are included to allow cross reference between Tables 15 and 16.

Tables 17 (i) - 17 (iv) present a cursory examination of the degree of matching by pairs obtained at the selection procedure. Table 17 (i) shows the number of subject variables controlled within each of the 18 pairs, i.e. the number of variables on which the experimental subject and control subject are said to be 'equal'. ('Equality' has been roughtly determined as follows:- (1) variables 3, 8 and 10 are directly comparable and either equal or unequal; (2) variables 1 and 2 are considered equal within a range of 2 years and 4 months respectively; (3) variables 4 - 7 incl. are considered equal

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Footnote on notations used:

The code numbers of patients are those allocated in the first instance. (P 53 is included in the experimental group, having entered the total population during Assessment 1). Where an individual is referred to the notations of EI (i.e. contained in exp. group of Experiment I) and C I (i.e. contained in control group of Exp. I) will be included after the code number.

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Table 15 : Measurement of patients in the experimental group (E I) on ten subject variables at selection procedure.

| EXPERIMENTAL GROUP (EI) PAIR | CODE NUMBER | 1 C.A. (years) | 2 M.A. (months) | 3 SEX M | 3 SEX F | 4 SELF-HELP SKILLS | 5 COMMUNICATION SKILLS | 6 SOCIALISATION SKILLS | 7 OCCUPATION SKILLS | 8 TOILET STATUS GROUP 2 | 8 TOILET STATUS GROUP 3 | 9 MOBILITY | 10 SENSORY DEFECT | CONTROL GROUP (CI) CODE OF PAIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 53 | 06 | 20·2 | M | | 22 | 21 | 13 | 16 | 2 | | LIMITED | - | 51 |
| 2 | 40 | 05 | 9·6 | M | | 23 | 9 | 3 | 17 | 2 | | FULL | - | 31 |
| 3 | 49 | 06 | 15·0 | M | | 24 | 10 | ·7 | 14 | 2 | | FULL | - | 32 |
| 4 | 01 | 08 | 10·4 | M | | 18 | 8 | 7 | 13 | 2 | | FULL | - | 15 |
| 5 | 05 | 07 | 8·8 | M | | 13 | 7 | 6 | 8 | 2 | | LIMITED | - | 30 |
| 6 | 26 | 09 | 9·6 | M | | 13 | 8 | 4 | 7 | | 3 | FULL | - | 25 |
| 7 | 22 | 08 | 9·2 | M | | 8 | 10 | 5 | 8 | | 3 | IMMOBILE | - | 17 |
| 8 | 19 | 09 | - | M | | 15 | 6 | 3 | 8 | | 3 | FULL | BLIND | 16 |
| 9 | 18 | 06 | 7·6 | M | | 15 | 8 | 5 | 7 | | 3 | FULL | - | 42 |
| 10 | 28 | 20 | - | | F | 18 | 14 | 5 | 10 | | 3 | FULL | PART. BLIND | 39 |
| 11 | 04 | 11 | 14·2 | M | | 20 | 9 | 6 | 16 | | 3 | LIMITED | - | 21 |
| 12 | 10 | 19 | - | M | | 13 | 9 | 2 | 6 | | 3 | FULL | - | 38 |
| 13 | 48 | 14 | 9·0 | M | | 15 | 11 | 6 | 10 | | 3 | FULL | - | 14 |
| 14 | 45 | 13 | 11·0 | M | | 15 | 15 | 11 | 12 | | 3 | LIMITED | - | 08 |
| 15 | 36 | 06 | 10·4 | | F | 13 | 2 | 1 | 8 | | 3 | FULL | - | 35 |
| 16 | 44 | 10 | 6·6 | M | | 11 | 8 | 6 | 7 | | 3 | LIMITED | - | 29 |
| 17 | 27 | 15 | 4·2 | M | | 12 | 9 | 3 | 2 | | 3 | LIMITED | - | 11 |
| 18 | 02 | 14 | 10·2 | M | | 18 | 9 | 7 | 11 | | 3 | LIMITED | - | 07 |
| | | | | | | (286) | (173) | (100) | (180) | | | | | |

Table 16 : Measurement of patients in the control group (C I) on ten subject variables at selection procedure.

| CONTROL GROUP (CI) | | SUBJECT VARIABLES → | | | | | | | | | | EXP. GROUP (EI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| PAIR | CODE NUMBER | C.A. (years) | M.A. (months) | SEX M | SEX F | SELF-HELP SKILLS | COMMUNICATION SKILLS | SOCIALISATION SKILLS | OCCUPATION SKILLS | TOILET STATUS GROUP 2 | TOILET STATUS GROUP 3 | MOBILITY | SENSORY DEFECT | CODE OF PAIR |
| 1 | 51 | 06 | 17·2 | M | | 25 | 12 | 11 | 24 | 2 | | FULL | - | 53 |
| 2 | 31 | 08 | 9·4 | M | | 19 | 11 | 5 | 10 | 2 | | FULL | - | 40 |
| 3 | 32 | 07 | 14·2 | | F | 25 | 13 | 9 | 15 | 2 | | FULL | - | 49 |
| 4 | 15 | 06 | 8·6 | M | | 19 | 11 | 10 | 16 | 2 | | FULL | - | 01 |
| 5 | 30 | 09 | 22·6 | M | | 26 | 21 | 17 | 22 | 2 | | FULL | - | 05 |
| 6 | 25 | 09 | 3·2 | M | | 10 | 6 | 4 | 5 | | 3 | LIMITED | - | 26 |
| 7 | 17 | 07 | 6·8 | M | | 10 | 8 | 2 | 6 | | 3 | IMMOBILE | - | 22 |
| 8 | 16 | 08 | - | M | | 12 | 9 | 2 | 2 | | 3 | LIMITED | - | 19 |
| 9 | 42 | 08 | 11·4 | M | | 19 | 10 | 9 | 13 | | 3 | LIMITED | - | 18 |
| 10 | 39 | 15 | - | | F | 15 | 10 | 6 | 12 | | 3 | FULL | - | 28 |
| 11 | 21 | 14 | 13·6 | M | | 15 | 20 | 10 | 10 | | 3 | IMMOBILE | - | 04 |
| 12 | 38 | 16 | - | M | | 12 | 10 | 3 | 0 | | 3 | LIMITED | - | 10 |
| 13 | 14 | 14 | 10·0 | M | | 14 | 9 | 3 | 10 | | 3 | LIMITED | - | 48 |
| 14 | 08 | 11 | 18·4 | | F | 10 | 16 | 10 | 15 | | 3 | IMMOBILE | - | 45 |
| 15 | 35 | 7 | 8·8 | | F | 16 | 8 | 3 | 13 | | 3 | FULL | - | 36 |
| 16 | 29 | 14 | - | M | | 11 | 9 | 3 | 10 | | 3 | LIMITED | BLIND | 44 |
| 17 | 11 | 14 | 4·6 | M | | 12 | 8 | 5 | 9 | | 3 | LIMITED | - | 27 |
| 18 | 07 | 15 | 10·2 | M | | 10 | 8 | 5 | 9 | | 3 | IMMOBILE | - | 02 |
| | | | | | | (280) | (199) | (117) | (201) | | | | | |

Table 17 (i) Degree of control of subject variables in pairs at selection procedure.

| Pair | No. of Variables Controlled (i.e. 'Equal') | No. of Variables uncontrolled. |
|---|---|---|
| 1 | 7 | 3 |
| 2 | 8 | 2 |
| 3 | 9 | 1 |
| 4 | 10 | 0 |
| 5 | 4 | 6 |
| 6 | 8 | 2 |
| 7 | 10 | 0 |
| 8 | 7 | 3 |
| 9 | 7 | 3 |
| 10 | 8 | 2 |
| 11 | 5 | 5 |
| 12 | 7 | 3 |
| 13 | 9 | 1 |
| 14 | 8 | 2 |
| 15 | 9 | 1 |
| 16 | 7 | 3 |
| 17 | 9 | 1 |
| 18 | 9 | 1 |

n = 18

Table 17 (ii) Distribution of pairs (n = 18) within the research sample by number of controlled variables (n = 10) at selection

| Number of Controlled Variables | Degree of Overall Control (%) | Number of Pairs. | Codes of Pairs. |
|---|---|---|---|
| 10 | 100 | 2 | (4, 7) |
| 9 | 90 | 5 | (3, 13, 15, 17, 18) |
| 8 | 80 | 4 | (2, 6, 10, 14,) |
| 7 | 70 | 5 | (1, 8, 9, 12, 16) |
| 6 | 60 | 0 | - |
| 5 | 50 | 1 | (11) |
| 4 | 40 | 1 | (5) |
| Less than 4 | less than 40 | 0 | - |
| | | n = 18 | |

Table 17 (iii) Number of pairs with control of subject variables (n = 10) at selection

| Subject Variable (No.) (n= 10) | Number of Pairs (n = 18 ) |
|---|---|
| 1 | 13 |
| 2 | 14 |
| 3 | 16 |
| 4 | 15 |
| 5 | 14 |
| 6 | 15 |
| 7 | 10 |
| 8 | 18 |
| 9 | 11 |
| 10 | 15 |

Table 17 (iv): Distribution of subject variables according to control by number of pairs.

| Number of Pairs (n = 18) | Number of Subject Variables | Identification of Subject Variables |
|---|---|---|
| 18 | 1 | (V. 8) |
| 17 | 0 | - |
| 16 | 1 | (V.3) |
| 15 | 3 | (Vs. 4,6,10) |
| 14 | 2 | (Vs. 2, 5) |
| 13 | 1 | (V.1) |
| 12 | 0 | - |
| 11 | 1 | (V.9) |
| 10 | 1 | (V.7) |
| Less than 10 | 0 | - |
| | n = 10 | |

within a 25% error on the range of that variable's score within the sample, i.e. an error of 4,5,3 and 5 respectively; (4) variable 9 equates limited mobility and immobility, therefore directly compares full mobility and incapacitated mobility). Tables 17 (ii) shows the distribution of pairs by number of controlled variables as, in terms of above, their degree of equality. Thus, 2 of the 18 pairs have a 100% degree of overall control and can be considered to be equally matched. 11 of the 18 pairs are matched on 8 or more of the 10 variables and 16 of the pairs on 7 or more. Only 2 of the pairs (pair 5 and pair 11) are poorly matched, with 4 or 5 of the 10 variables being equal. If a 70% degree of overall control (i.e. 7 out of 10 variables matching) is taken as a satisfactory minimum thenonly 2 pairs fall below this standard.

Tables 17 (iii) and 17 (iv) show the sensitivity of the 10 subject variables, the first showing the number of pairs in which each of the variables is equal and the second the frequency distribution of these. It can be seen that variable 8 (i.e. toilet status) is the most sensitive, with all of the 18 pairs being equally matched. Other variables which can be considered to have a satisfactory matching value are variables 3 (sex), 4(self-help skills), 6 (socialisation skills) and 10 (sensory defects). Variables 2, 5 and 1 (M.A., communication skills and C.A.) are less satisfactory and variables 7 and 9 (occupation skills and mobility) are the least satisfactorly matched between the pairs. This breakdown suggests that the degree of precision control achieved in the matching procedure can be considered according to groups of variables within the total of 10 measured at the selection procedure.

More important, in view of the two-group experimental design, is to consider the 'equality' of the two groups. Tables 18(i) -18(vi)

and Figures 6 - 10 present comparisons of subject variables within the experimental and control groups selected.

Table 18 (i) shows the mean and median ages to be equivalent within both groups. In the experimental group, the mean is 10.3 years and the median 10 ; and, in the control group, the mean is 10.4 years and the median 10. The only difference between the two groups in respect of age is in the age range, this being 5 - 20 years in the experimental group and 6 - 16 in the control group.

Distribution of mental age in the two groups, in four-monthly ranges, shows a similarity in range (0-20.2 months in Exp. group and 0-22.6 months in control group) and in mode (range 8 - 11.9 months in both groups), although the distribution differs slightly between the two groups in both extremes of the range overall. (See Table 18 (ii) ).

Table 18 (iii) shows an equal distribution of male and female patients in both groups with 15 males and 3 females in the experimental group and 14 males and 4 females in the control group.

Table 18 (iv) and Figures 6 - 10 relate to the comparison of subject variables 4 - 7 inclusive in the two groups. Table 18 (iv) indicates the totals of the groups' scores in each of the four quadrants of the P-PAC and in the overall total. The following histograms (Figs. 6 - 10) show these scores of each group in relation to the possible scores, and present a visual appreciation of the near equality of these variables between the experimental and control groups. The overall total score of the control group (797) is slightly higher than that of the experimental group (739). This slight difference also relates to three of the quadrants (communication, occupation and socialisation), but not to the fourth (self-help). (Statistical analyses of these data are provided later). Thus, a generally satisfactory equality is seen between the two groups in relation to these four subject variables.

Table 18 (i): Distribution of age (subject variable 1) in the Experimental and Control groups.

| Age (years) | Frequency (f) in Experimental group. | Frequency (f) in control group. |
|---|---|---|
| 5 | 1 | 0 |
| 6 | 4 | 2 |
| 7 | 1 | 3 |
| 8 | 2 | 3 |
| 9 | 2 | 2 |
| 10 | 1 | 0 |
| 11 | 1 | 1 |
| 12 | 0 | 0 |
| 13 | 1 | 0 |
| 14 | 2 | 4 |
| 15 | 1 | 2 |
| 16 | 0 | 1 |
| 17 | 0 | 0 |
| 18 | 0 | 0 |
| 19 | 1 | 0 |
| 20 | 1 | 0 |
| | n = 18 | n = 18 |
| Age Range: | 5 - 20 | 6 - 16 |
| Mean Age : | 10 . 3 | 10 . 4 |
| Median Age: | 10 | 10 |

Table 18 (ii) Distribution of MENTAL AGE (subject variable 2) in the Experimental and Control Groups.

| Mental Age (months) | Frequency in Experimental Group | Frequency in Control Group |
|---|---|---|
| 0 - 3.9 | 3 | 5 |
| 4. 0 - 7.9 | 3 | 2 |
| 8. 0 -11.9 | 9 | 6 |
| 12. 0- 15.9 | 2 | 2 |
| 16. 0- 19.9 | 0 | 2 |
| 20. 0- 23.9 | 1 | 1 |
| | n = 18 | n = 18 |

Table 18 (iii) Distribution of SEX (subject variable 3) in the Experimental and Control Groups

| Sex | Total | Experimental Group | Control Group |
|---|---|---|---|
| Male | 19 | 15 | 14 |
| Female | 7 | 3 | 4 |
| | n = 36 | n = 18 | n = 18 |

Table 18 (iv): Distribution of subject variables 4 - 7 inclusive (self-help, communication, socialisation and occupational skills) in the Experimental and Control groups.

| Skills (Quadrant of PAC) | Experimental Group | Control Group |
|---|---|---|
| Self-Help | 286 | 280 |
| Communication | 173 | 199 |
| Socialisation | 100 | 117 |
| Occupation | 180 | 201 |
| TOTAL P-PAC SCORE | 739 | 797 |

Subject variable 8 (toilet status) is earlier identified as the most consistent variable at the matching procedure between pairs, with this being equal within all 18 pairs. Table 18 (v) shows that 5 patients in each group are within toilet status group 2 (i.e. "being potty trained") and 13 patients in group 3 (i.e. "incontinent/untrainable").

Mobility (subject variable 9) is shown earlier to be one of the least consistent variables at the matching procedure. Table 18 (vi) shows the distribution of this variable between the two groups, showing some degree of inequality. There are 10 patients with full mobility in the experimental group and 7 in the control group; an equal number (7) with limited mobility in each group; and more immobile patients (4) in the control group than the experimental

Table 18 (v) : Distribution of TOILET STATUS groupings (variable 9) in the Experimental and Control groups.

| Toilet Status | Frequency in Experimental Group | Frequency in Control Group | Total |
|---|---|---|---|
| Group 2 ("being potty trained") | 5 | 5 | 10 |
| Group 3 ("incontinent/untrainable") | 13 | 13 | 26 |
| | n = 18 | n = 18 | n = 36 |

Table 18 (vi) : Distribution of MOBILITY STATUS (variable 9) in the two groups.

| Mobility Status | Frequency in Exp. Group. | Frequency in Control Group | Total |
|---|---|---|---|
| Full mobility | 10 | 7 | 17 |
| Limited mobility | 7 | 7 | 14 |
| Immobile | 1 | 4 | 5 |
| | n = 18 | n = 18 | n = 36 |

group (1). There are 8 patients in the experimental group with some degree of mobility incapacity, and 11 in the control group. Subject variable 10 (sensory defect) has a low incidence in the research sample as a whole with only 3 patients of the 36 being affected. The experimental group contains two of these (one blind, one partially blind) and the control group contains one (blind).

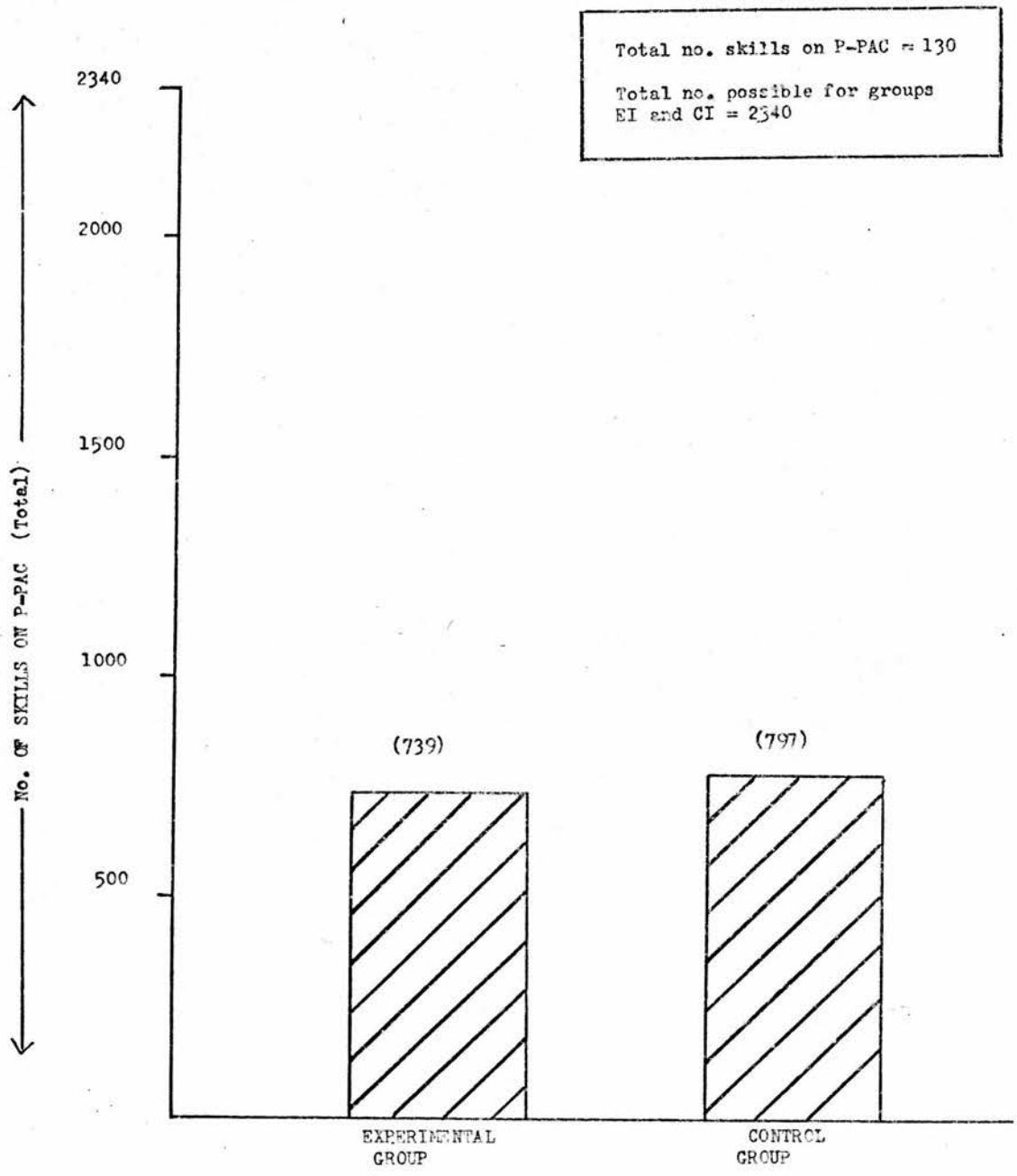



Figure 6 : Histogram of distribution of subject variables 4-7 incl. in the experimental and control groups (showing proportion of skills gained on total P-PAC).

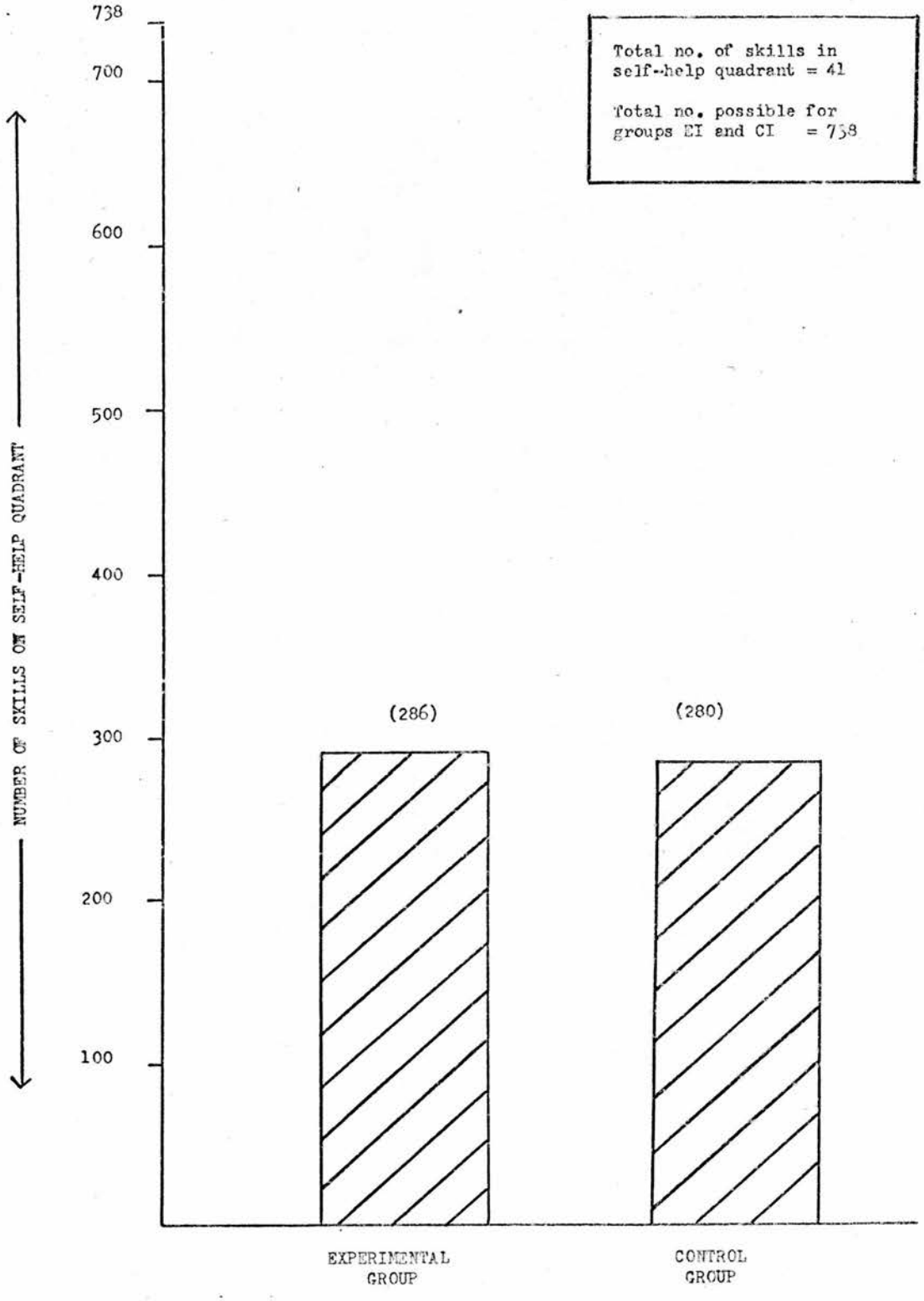



Figure 7 : Histogram of distribution of subject variable 4 (self-help skills) in the experimental and control groups (showing proportion of skills gained on one quadrant of P-PAC).

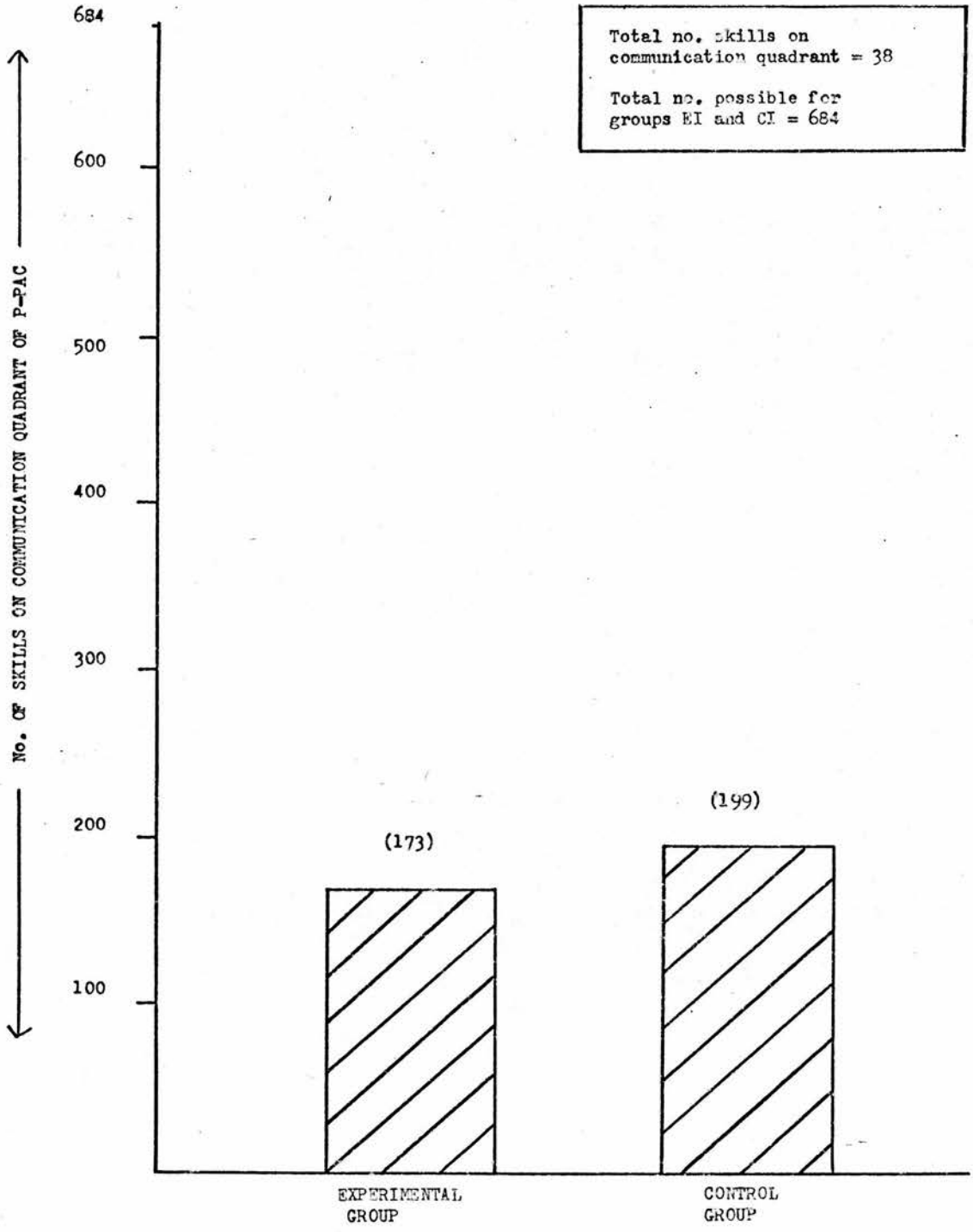



Figure 8 : Histogram of distribution of subject variable 5 (communication skills) in the experimental and control groups (showing proportion of skills gained on one quadrant of P-PAC).

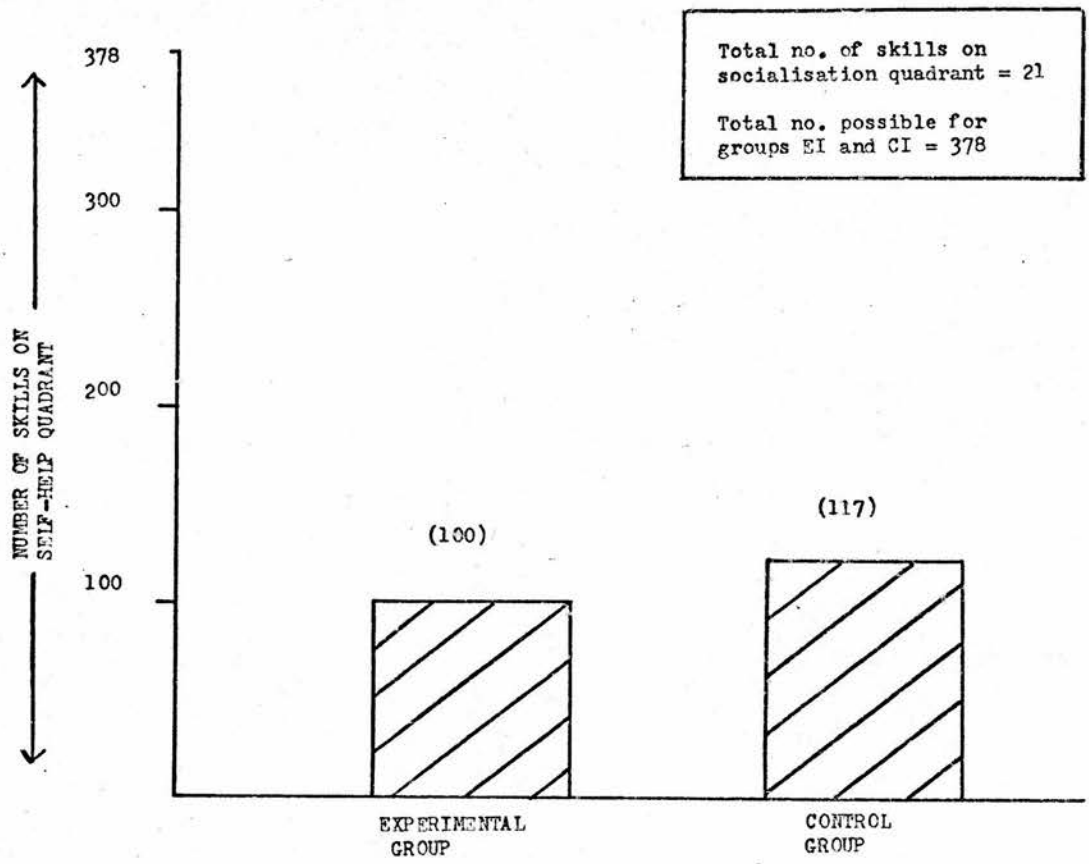



Figure 9 : Histogram of distribution of subject variable 6 (socialisation skills) in the experimental and control groups (showing proportion of skills gained on one quadrant of P-PAC).

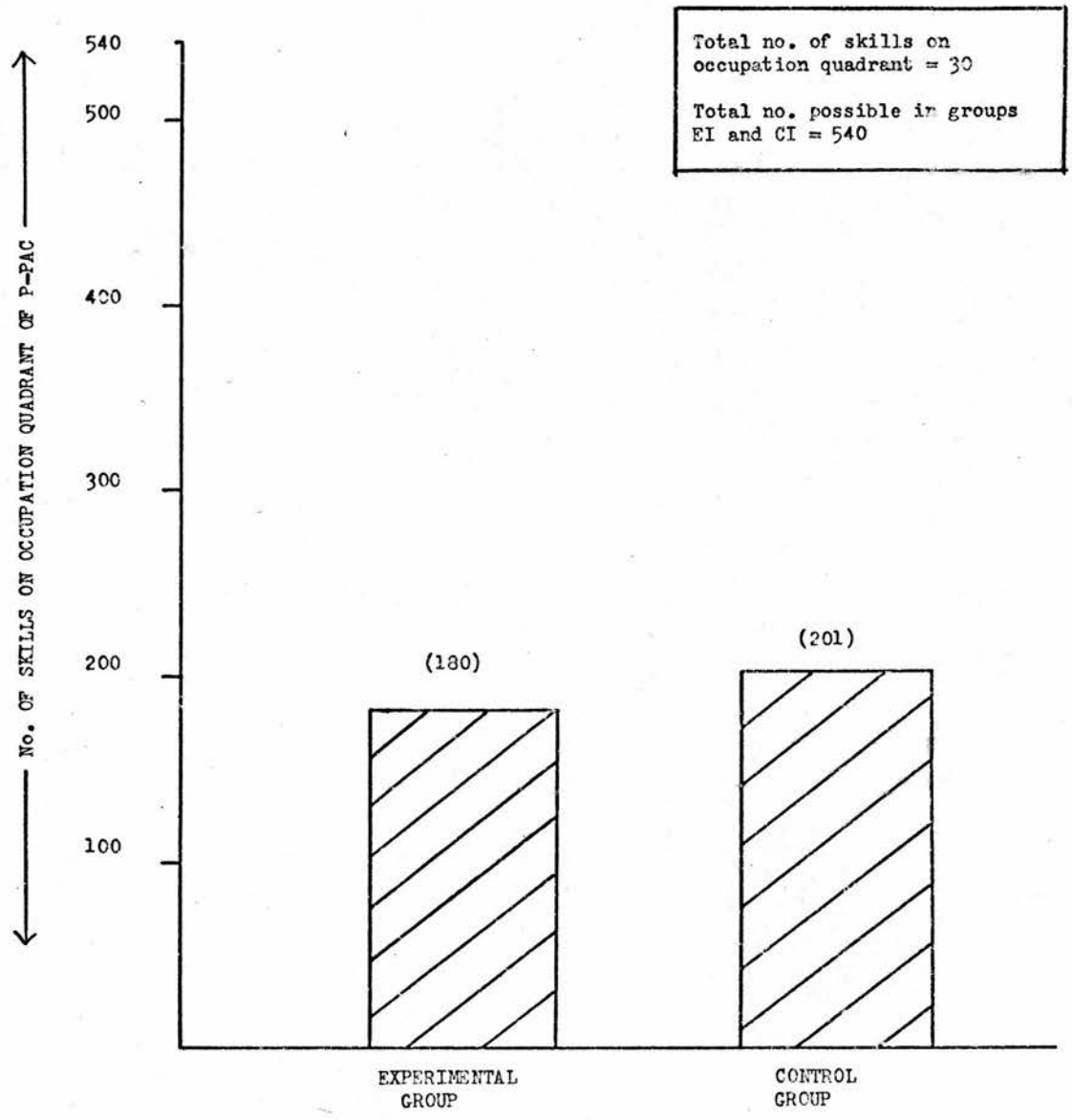



Figure 10 : Histogram of distribution of subject variable 7 (occupation skills) in the experimental and control groups (showing proportion of skills gained on one quadrant of P-PAC).

In providing this comparison of the distribution of the 10 subject variables between the two groups, a reasonably equal distribution has been achieved. Almost exact or exact equality is seen in relation to subject variables 1, 3 and 8 (age, sex and toilet status). Subject variables 2, 4, 5, 6, 7 and 10 are fairly equally distributed, while subject variable 9 shows some inequality (giving the advantage to the experimental group).

Comparison is now briefly made in relation to those characteristics studied in the total population which are not included as subject variables (i.e. epilepsy, degree of mental deficiency, length of hospitalisation and prevalence of physical incapacity.) Tables 19 (i) - 19 (iv) show these characteristics in the two groups. There is a high degree of equality between the groups in respect of prevalence of epilepsy (10 patients in the experimental group and 9 in the control group), distribution of patients by degree of mental deficiency (5 medium - and 13 low-grade patients in the experimental group; and 4 medium - and 14 low-grade patients in the control group), and in respect of prevalence of physical incapacity by paralysis (4 patients in each group showing mild paralysis, and 4 in each group showing severe paralysis). There is a slight difference between the groups in terms of length of hospitalisation. The mean length in the experimental group is 4.4 years, one year shorter than that in the control group (5.4 years). More patients in the experimental group have been admitted less than 5 years previously than in the control group. Thus, although these specific characteristics are not accounted for in the pairing procedure of selection, there is a reasonably equal distribution between the two groups, this showing the sensitivity of the subsequent randomisation procedure.

Table 19 (i): Prevalence of EPILEPSY in the Experimental and Control Groups and Total Population

| Group | Number of Epileptics | Percent. |
|---|---|---|
| Experimental Group (n = 18) | 10 | 55.5 |
| Control Group (n = 18) | 9 | 50 |
| Research Sample(n = 36) | 19 | 50 |
| Total Population (N = 52) | 24 | 46.2 |

Table 19 (ii): Distribution of patients by DEGREE OF MENTAL DEFICIENCY in the Experimental and Control Groups and Total population

| | n | Degree of Deficiency | | |
|---|---|---|---|---|
| | | High | Medium | Low |
| Experimental Group | 18 | 0 | 5 | 13 |
| Control Group | 18 | 0 | 4 | 14 |
| Research Sample | 36 | 0 | 9 | 27 |
| TOTAL POPULATION | 52 | 1 | 16 | 35 |

Table 19 (iii): Distribution of patients by LENGTH OF HOSPITALISATION in the Experimental and Control groups & Total Population.

| Time Category | Length time since admission (years) | Number of Patients | | |
|---|---|---|---|---|
| | | Exp. Group (n=18) | Control Group (n = 18) | Total Pop (n=52) |
| 0 | 0–1 | 4 | 1 | 5 |
| 1 | 2–4 | 5 | 3 | 16 |
| 2 | 5 | 6 | 9 | 16 |
| 3 | 6–9 | 2 | 4 | 12 |
| 4 | 10 and over | 1 | 1 | 3 |
| | | 18 | 18 | 52 |
| | mean: | 4.4 | 5.4 | 5.1 |
| | median: | 4.5 | 5 | 5 |

Table 19 (iv): Prevalence of physical incapacity (paralysis) in the Experimental and Control Groups.

| Physical incapacity | Exp. Group | Control Group |
|---|---|---|
| None | 10 | 10 |
| Mild | 4 | 4 |
| Severe | 4 | 4 |
| | n=18 | n=18 |

CHAPTER 7:

METHOD (III) - The Nurses.

(i) Selection of nursing staff:

No specific selection of nursing staff was employed in the study in keeping with the 'representative situation' required for the study. Those nurses who were working in Lewis Ward when the study commenced comprise the initial nursing staff population. The terms 'nursing staff' and 'nurse' are used to refer indiscriminately to both trained nurses and untrained nursing assistants (unless specification is appropriate).

Nursing staff working in Lewis Ward at the time the study was introduced were not given the opportunity by the researcher to consider whether or not they desired to participate, the assumption being that consent for the undertaking of the study (from nursing and medical administrators) had been appropriately obtained. However, if a nurse requested to opt out of the study, the provision for her transfer to another ward would be made. Nurses joining the staff after the commencement of the study were therefore in a slightly different position, being told about it in advance. No nurse requested to be transferred or to be exempt from full participation during the course of the study (to the researcher's knowledge).

No controls over the selection of staff to the ward or transfer from the ward were exerted. No attempt was made to maintain a minimal or steady nurse:patient ratio.

(ii) Description of Initial Nursing Staff Population:

The initial nursing staff population comprised those nurses working in Lewis Ward during Assessment 1.

The complement of staff totals 20. Table 20 shows the distribution of staff by staff category. One Ward Sister (02) and one

nursing assistant (13) were part-time and all other nurses were full-time. Five of the nursing assistants (16, 17, 18, 19, 20) were temporary staff (students in vacation employment) and the remaining 15 staff were in permanent employment.

Table 20: Distribution of the nursing staff (N = 20) by staff category. (as at July/August 1972)

| Category | Number of Staff | Codes of Staff |
|---|---|---|
| Ward Sister (R.N.M.D.) | 2 | (01, 02) |
| Staff Nurse (R.N.M.D.) | 1 | (03) |
| Enrolled Nurse (S.E.N.) | 2 | (04, 05) |
| Nurse in Training | 0 | - |
| Nursing Assistant | 15 | (06 - 20 incl.) |
| | N = 20 | |

The initial staff population comprised a ratio of trained nurses: untrained nurses of 1:3. Two Ward Sisters, one Staff Nurse and two Enrolled Nurses made up the 'trained staff' group.

All of the nurses are female.

The 5 temporary nursing assistants are all aged 20 years or under. Of the 15 permanent staff, one is under 30 and the majority (n = 9) are between 30 and 50. (See Table 21). 12 of the permanent staff are married (9 with children and 3 without) and 3 are unmarried. All of these 15 nurses had worked in Lewis Ward for a minimum of 12 months prior to the commencement of the study.

The nursing staff of Lewis Ward therefore comprises a core of permanent staff, the majority of which are untrained nursing assistants with at least one year's experience in the ward. Most

Table 21: Distribution of the nursing staff (n = 20) by age.

| Age (Years) | Number of nurses |
|---|---|
| 20 and under | 7 |
| 20 - 29 | 1 |
| 30 - 49 | 9 |
| 50 and over | 3 |
| | n = 20 |

are married women, of over 30 years of age, with children. This permanent staff is temporarily supplemented by a small group of young single, nursing assistants.

With the exception of the 2 part-time staff, all nurses work a 5 - day week on shift duty. The shifts are a 'morning' shift from 7.00a.m. to 2.30 p.m. and an 'afternoon' shift from 1.00p.m. to 10.00 p.m. There are two meal breaks during each shift. (The night shift from 9.30 p.m. to 7.00 a.m. is staffed by nurses permanently on night duty. Usually 2 nurses are available to Lewis Ward).

Table 22 shows the staffing of Lewis Ward during 5 weeks of Assessment 1. The number of nurses on duty for the 'morning' and 'afternoon' shifts is shown for each day of the period documented. (A shift is calculated as one nurse with the exception of one of the part-time nurses whose shift is calculated as 0.5 of a nurse). The number of nurses on duty varies between 4 and 7 on either shift; and the total number of shifts worked per day ranges from 9.5 - 13.5 . The total number of shifts worked in the 5-week period is 386.0, this ranging from 72.5 per week (week 4) to 81.5 per week

Table 22 : Number of nurses on duty during a five-week period in Lewis Ward.
(16 July - 13 August, 1972)

| | WEEK 1 | | | | | | | WEEK 2 | | | | | | | WEEK 3 | | | | | | | WEEK 4 | | | | | | | WEEK 5 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S | S | M | T | W | T | F | S |
| Number of nurses on morning shift | 6 | 6 | 5 | 6 | 6 | 6 | 6 | 6 | 6·5 | 5 | 5·5 | 6·5 | 6 | 6·5 | 6 | 4 | 6 | 5 | 6 | 6 | 5 | 5 | 6 | 4·5 | 4·5 | 4·5 | 5 | 5 | 6·5 | 6 | 6·5 | 6 | 5·5 | 6·5 | 7 |
| Number of nurses on afternoon shift | 5·5 | 5·5 | 6·5 | 6·5 | 7 | 7 | 6 | 6 | 5 | 6·5 | 5 | 5 | 5 | 6 | 5 | 5·5 | 6·5 | 5·5 | 5·5 | 6·5 | 6 | 5 | 5·5 | 5 | 6 | 6 | 5·5 | 6 | 7 | 7 | 6 | 4·5 | 5 | 4 | 5 |
| TOTAL no. of shifts worked per day | 11·5 | 11·5 | 11·5 | 12·5 | 13·0 | 13·0 | 12·0 | 12·0 | 11·5 | 11·5 | 10·5 | 11·5 | 11·0 | 12·5 | 11·0 | 9·5 | 12·5 | 10·5 | 11·5 | 12·5 | 11·0 | 10·0 | 11·5 | 9·5 | 10·5 | 10·5 | 10·5 | 11·0 | 13·5 | 13·0 | 12·5 | 10·5 | 10·5 | 10·5 | 12·0 |
| TOTAL no. shifts worked per week | | | | | 73.0 | | | | | | | 80.5 | | | | | | | 78.5 | | | | | | | 72.5 | | | | | | | 81.5 | | |

Total no. shifts worked in total period = 386.0

(week 5).

Table 23 shows the number (and percentage) of shifts worked, and not worked, in this period. This is based on the calculation of the total number of shifts possible in one week as 95.5 and in a five-week period as 477.5 83.83% of possible shifts are actually worked; 19.17% are not worked (6.29% due to holiday leave entitlement and 12.88%due to sick leave).

Table 23: Numbers of total shifts, worked and not worked

Total no. of shifts available in 5-week period = 477.5

| Shifts | Number | Percentage |
|---|---|---|
| Worked | 386.0 | 80.83 |
| Not worked (due to holiday leave) | 30.0 | 6.29 |
| Not worked (due to sickness absence) | 61.5 | 12.88 |
| | n = 477.5 | 100.00 |

Table 24 contains calculations relevant to the nurse: patient ratio during the 5-week period. These are based on the number of shifts actually worked (as in Table 22). The nominal nurse: patient ratio is 20:52 (i.e. 1:2.6); and the actual nurse:patient ratio ranges from 1:13 (4:52) to 1:7.4 (7:52). The mean ratio overall in this period is 1: 9.1 and the median ratio is 1:8.6.

Table 24: Nurse: patient Ratios on Lewis Ward over a Five-week Period.

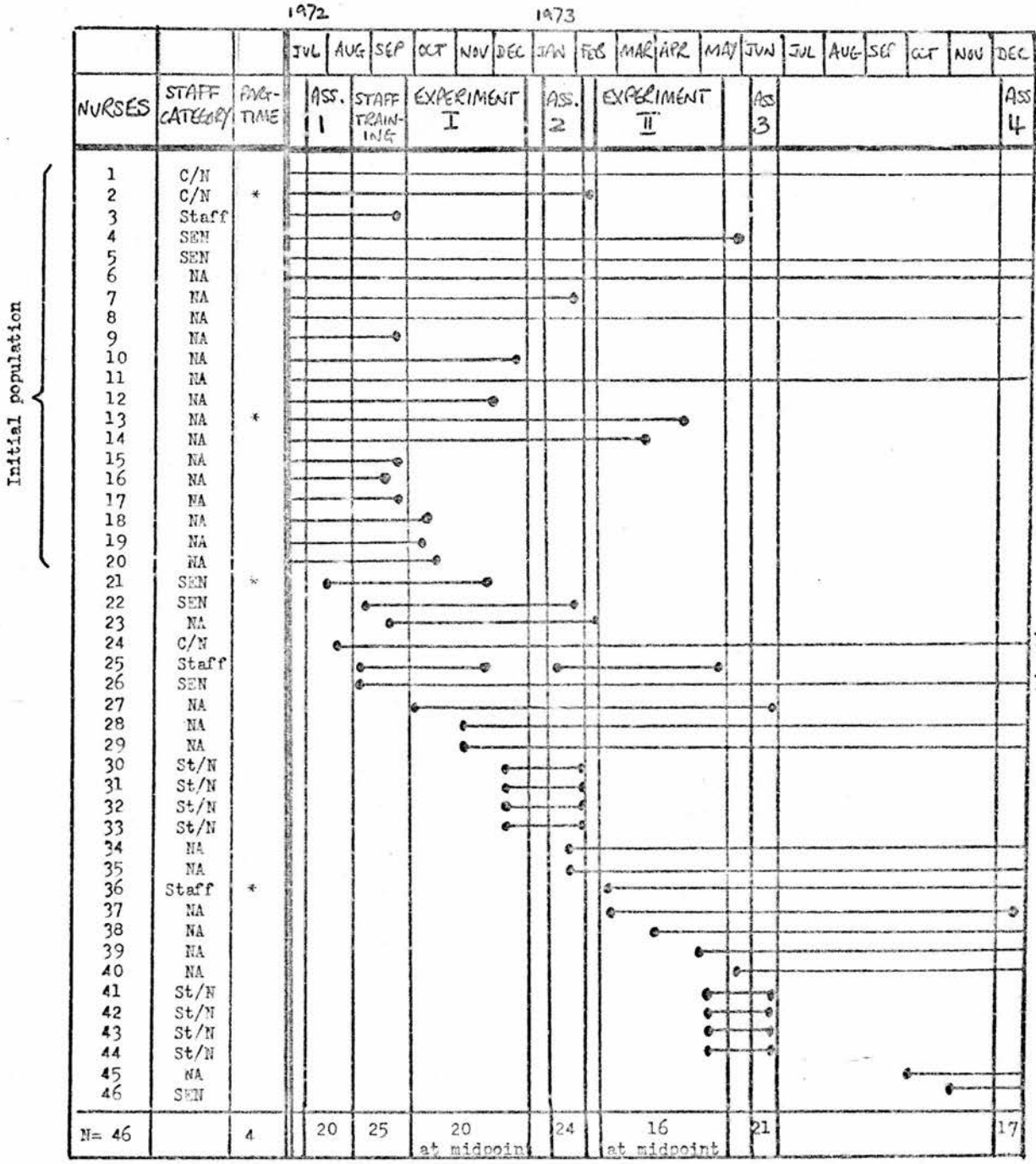
| Number of nurses | Ratio represented by number | Morning Shift n | Morning Shift % | Afternoon Shift. n | Afternoon Shift. % |
|---|---|---|---|---|---|
| 4.0 | 1:13.0 | 1 | 2.86 | 1 | 2.86 |
| 4.5 | 1:11.5 | 3 | 8.57 | 1 | 2.86 |
| 5.0 | 1:10.4 | 7 | 20.00 | 9 | 25.71 |
| 5.5 | 1: 9.4 | 2 | 5.71 | 7 | 20.00 |
| 6.0 | 1: 8.6 | 15 | 42.86 | 8 | 22.86 |
| 6.5 | 1: 8.0 | 6 | 17.14 | 5 | 14.29 |
| 7.0 | 1: 7.4 | 1 | 2.86 | 4 | 11.42 |
| | | n = 35 | 100.00 | n = 35 | 100.00 |

| | | | |
|---|---|---|---|
| Range = 4.0 - 7.0 | Range of ratio = 1: 13.0 - 1: 7.4 | Mean Number of nurses per morning shift = 5.7<br>mean ratio = 1:9.1<br>median ratio= 1: 8.6 | Mean number of nurses per afternoon shift = 5.7<br>mean ratio = 1:9.1<br>median ratio = 1: 8.6 |

(iii) Changes in the Staff Population:

Considerable changes ensued in the nursing staff population during the course of the study as a result of nurses leaving, or being transferred, and then replaced. In addition, the nursing staff complement varied as did the 'nominal' and 'actual' nurse: patient ratios. The exact nature of the changes is complex and not relevant to document and therefore selective data are presented merely to substantiate the main changes which occured.

By the final stage of the study (i.e. Assessment 4) a total of 46 separate nurses had been involved in the study by virtue of employment within the ward. The duration of the period of employment, and the points at which employment commenced and ceased, are relevant factors to report. Figure 11 presents a graphic illustration of these factors in relation to each of the 46 nurses involved and the main stages of the study. A line represents the duration of a nurse's employment in the ward; and an adjoining dot, the point of entry and/or departure (these showing the approximate calendar point). Thus, the Figure shows the relevant duration for any one nurse and also the situation for any one point in time during the study. The nurses are arranged from 1 - 20 according to classification within the initial population and, thereafter according to sequence of entry. One particular point clearly illustrated is the small proportion of nurses to remain in the ward throughout the total period of the study. Only 7 nurses (01,05,06, 08,11,24,26) remain at Assessment 4, having been involved in all stages of the study. Of these, 5 are contained in the initial population; the other 2 (24 and 26) joined the staff during Assessment 1 and the staff training programme respectively.




C/N = Charge Nurse
Staff = Staff Nurse
SEN = Enrolled Nurse
St/N = Student Nurse
NA = Nursing assistant

● DEPARTURES and ARRIVALS

× NURSES REMAINING AT END FROM TOTAL POPULATION (n = 7)

Figure 11 : Duration of nurses' employment in Lewis Ward during study.

Of the 20 nurses in the initial population, only one-half (n = 10) remained in the ward on completion of Experiment I (i.e. Assessments 1 and 2 plus Experiment I). Eight of the ten to leave did so before the experimental phase actually commenced (or within the first 30 days). Five of these were the temporary staff (Nos. 16 - 20); one a Staff Nurse (03); and two nursing assistants (09 and 15).

Table 25 shows the distribution of staff according to category during the study. An assessment of changes in the nursing staff requires to look at departures and entries as well as the complement of staff, the nominal nurse:patient ratio, the actual nurse:patient ratio and the% of shifts worked. The summary of these calculations is provided by Table 26. This shows the importance of obtaining and documenting such data throughout the study in view of the fact that baseline data turned out to be unrepresentative of the situation at later stages in the study. Attention is drawn to the significance of some of the calculations presented. The situation during Exp. I is not greatly different from that during Assessment I, with the total complement remaining at 20 (the nominal nurse:patient ratio therefore being 1:2.60); and the actual nurse:patient ratio only slightly lower at 1:10.00 (compared with 1:9.12). However, one difference is that the highest turn-over of staff occurs during Experiment I with 7 posts vacated and 3 filled (plus the start of a secondment for 4 student nurses). Assessment 2 shows the highest complement of staff (n = 24), raised by the group of seconded students; the highest nurse:patient ratio (at 1:8.66); and the lowest percentage of shifts not worked (16.24%). Experiment II requires to be noted as the least satisfactory period in terms of the staffing situation. The total complement of staff (at the mid-point of the phase) is 17

and the mean number of nurses per shift is low at 3.7. This provides a calculation of the mean nurse:patient ratio as 1:14.05. This occurs not only as a result of the low staff complement but also due to the highest percentage of shifts not worked (24.21%). Only 3 posts were vacated during Experiment II and 4 filled (4 seconded nurses entering at the end of the phase). The situation improved again during Assessment 3 but had deteriorated by Assessment 4 when the complement was reduced to 17 and the ratio to 1:13.00.

Table 25: Distribution of nursing staff by category at main stages of study.

| Category | Ass. 1 | Exp. I | Ass. 2 | Exp. II | Ass. 3 | Ass. 4 |
|---|---|---|---|---|---|---|
| Ward Sister (RNMD) | 2 | 3 | 3 | 2 | 2 | 2 |
| Staff Nurse (RNMD) | 1 | 1 | 2 | 2 | 2 | 2 |
| Enrolled Nurse | 2 | 5 | 5 | 3 | 2 | 3 |
| Nurse in Training | 0 | 0 | 4 | 0 | 4 | 0 |
| Nursing Assistant | 15 | 11 | 10 | 9 | 11 | 10 |
| Total Complement | 20 | 20 | 24 | 16 | 21 | 17 |

Apart from the posts vacated by the 5 temporary nursing assistants in post at the start of the study, and those created temporarily and then vacated by the 2 groups of seconded student nurses (n = 8), a total of 16 nurses vacated posts during the study. This group comprises two Staff Nurses (03 and 25); three Enrolled Nurses

Table 26: Calculations relevant to nurse: patient ratios in Lewis Ward in main stages of the Study.

| | Ass. 1 | Exp. I | Ass. 2 | Exp. II | Ass. 3 | Ass. 4 | |
|---|---|---|---|---|---|---|---|
| Total complement | 20 | 20 | 24 | 16 | 21 | 17 | |
| Nominal nurse: patient ratio | 1: 2.60 | 1: 2.60 | 1: 2.16 | 1: 3.25 | 1: 2.47 | 1: 3.05 | |
| Mean No. nurses per shift | 5.7 | 5.2 | 6.0 | 3.7 | 5.2 | 4.0 | |
| Mean nurse: patient ratio (actual) | 1: 9.12 | 1:10.00 | 1: 8.66 | 1:14.05 | 1:10.00 | 1:13.00 | |
| % shifts not worked | 19.12 | 21.03 | 16.24 | 24.21 | 20.01 | 17.00 | |
| No. of posts vacated | 0 | 7 | 6* | 3 | 5* | 2 | Total = 23 |
| No. of posts filled/commenced | 2 | 7* | 3 | 8* | 0 | 0 | Total = 20 |

* including 4 seconded students.

(04,21 and 22); and 11 nursing assistants (02,07,09,10,12,13,14,15, 23,27,37). The reasons for the departure of these nurses (as given by the nurse herself) are tabulated below (Table 27).

Table 27: Reasons for leaving Lewis Ward as given by departing nurses (n = 16)

| Reasons | Number of nurses |
|---|---|
| Resignation advised on medical grounds | 3 |
| Leaving to commence nurse training | 2 |
| Transfer to another ward requiring staff | 6 |
| Transfer to adult ward by request | 1 |
| Resignation for confinement | 1 |
| Retirement | 1 |
| Resignation to take up other employment (non-nursing) | 2 |
| | n = 16 |

The reasons most frequently given (n = 6) is transfer to another ward in the hospital requiring staff, this being requested by nursing administration. In 4 cases, the nurses had been told that their period of employment in Lewis Ward would be temporary. In most other cases (n = 9), the nurses left the ward and the hospital, and various reasons are noted. The three nurses resigning one to ill-health had all had periods of absence preceding resignation. The two nurses leaving to take up other employment had completed only short periods of service in the ward; and neither had previous experience of mental deficiency nursing. The remaining case involves a transfer to another ward at the request of the nurse. This was a preference to return to adult mental deficiency in which she had worked for many years previous

to employment in Lewis Ward.

(iv) Training programme for nursing staff:

The nursing staff had no previous knowledge or experience of behaviour modification principles and techniques. A training programme was therefore prepared and implemented prior to their involvement in the experimental study and procedure. The training programme was undertaken between Assessment 1 and Experiment I, That period was selected to prevent contamination of baseline data by nurses applying behaviour modification techniques to patients, or by their change in work activities. It was also felt that the first assessment period would provide the researcher with the opportunity to interact with the nurses before undertaking a training programme with them. The training programme was designed to include general aspects of behaviour modification theory and practice and their particular application to toilet training. A brief explanation of the study and preparation for the nurses' involvement in data collection related to Assessment 1 had been provided prior to that first phase of the study. It is necessary to note the fact that the researcher herself was neither experienced as a behaviour therapist, nor as a teacher. Advice was sought from individuals (particularly clinical psychologists) in the development of the nurse training programme. It was not possible to employ other personnel for this purpose on grounds of time or cost.

A variety of teaching methods and aids were used in the programme, these including (1) formal talks, (2) discussion sessions, (3) films and slides, (4) demonstrations of techniques, (5) supervised practice sessions, (6) programmed text material (from Rainhill Hospital ), and (7) hand-outs.

A major problem in the organisation of the nurse training programme was in having the nurses available during their on-duty time. Training sessions were most easily held in the overlap period of the morning and afternoon shifts (1.00 - 2.30 p.m.). Other sessions were held during the breakfast period (9.00 - 9.45 a.m.) and the evening break (8.00 - 8.45 p.m.) and, although nurses were not obliged to give up these break times, they were extremely willing to do so.

The training programme was designed to include 8 sessions of 45-60 minutes. All nurses working in the ward during the period concerned were accomodated each to attend each of the 8 sessions. Appriximately 40 sessions had to be provided to achieve this. A timetable for the programme's session was displayed. Attendance was not compulsory. The Ward Sisters and Unit Nursing Officer were consulted in the arrangements for the programme. They, and the nurses, co-operated to ensure its completion. It was agreed that sessions would be cancelled if nursing duties required this, but only one session had to be postponed.

All nurses joining the ward staff later than the period of the programme were involved in a similar exercise at that point. The high staff turnover previously described resulted in the training programme (and on-going nurse training and supervision) providing a continuing and time-consuming activity for the researcher. However, this provided scope for improvement and practice.

A synopsis of the context of the 8 sessions within the training programme is provided below:-

Session 1: "The experimental toilet training study".

Content: Background to the study; the aims of nursing research; problems of incontinence; methods of toilet training mental defectives; role of the mental deficiency nurse in patient training and rehabilitation; specific aims of the present study; research design of the study.

Method: Talk followed by discussion and answering of questions.

Follow-up: Summary hand-out provided after session.

Session 2: "Introduction to the principles of behaviour modification."

Content: Definition of behaviour; principles of learning and behaviour change; reinforcement (positive and negative); punishment; techniques to increase the frequency of behaviour by positive reinforcement (shaping, chaining, prompting); techniques to decrease the frequency of behaviour by positive reinforcement (extinction).

Method: Lecture, using flannelograph.

Follow-up: Distribution of programmed text ("Introduction to Behaviour Modification", Gathercole and Epling).

Session 3: "Behaviour modification - toilet training."

Content: Definitions of toilet behaviour and toilet training; review of results of research studies (Ellis, Dayan, Giles, Wolf, Levine and Elliott); aspects involved in toilet training by behaviour modification (establishment of $R_e$ + toilet behaviour by shaping; extinction of incontinence); behaviour modification techniques in toilet training (shaping, prompting, positive reinforcement, extinction, reinforcement of competing behaviours, other techniques).

Method: Lecture followed by demonstration.

Demonstration: (a) Non reinforcement of incontinent elimination and management of incontinence.
(b) Behaviour shaping of an aspect of toilet behaviour using prompting techniques (pulling down trousers).

Follow-up: Summary hand-out (a) review of toilet training studies (after Rentfrow and Rentfrow, 1969); (b) definition of techniques; (c) individual practice sessions on shaping and chaining in teaching undressing skills.

Session 4: "Behaviour shaping".

Content: (a) Film ('operant conditioning of a Rat'; Thomas) showing shaping of lever-pressing response.

(b) Practice session: Behaviour shaping of toilet behaviour ('going', 'dressing', 'sitting', 'eliminating').

(c) Discussion of the 'model of shaping toilet behaviour'.

Session 5: "The procedure of the experimental toilet training study".

Content: Presentation of pre-experimental data; the experimental and control groups; the experimental procedure; data collection during the experimental phase; management of other patients during the experimental phase.

Method: Talk followed by discussion, using slides.

Practical Session: Recording of elimination responses on charts to be used.

Follow-up: List of patients in the experimental group to be learned and patients to be observed.

Session 6: "Preparations for the experimental phase".

Content: Review of procedure of toilet and incontinence management of experimental group; setting of targets on the the model and completion of patients' programme schedule.

Method: Illustrated talk followed by work session using programme schedules and models.

Follow-up: Hand-out on procedure.

Session 7: " Films and Discussion"

Content: Films ("Help for Mark" and "Teaching Language to Psychotic Children").

Discussion: Applications of behaviour modification techniques in mental deficiency; reinforcement as the central concept of behaviour modification; the credibility of results of behaviour modification; the effects of the films on nurses' attitude to handicaps associated with mental deficiency.

(Session open to nurses from other wards)

Session 8: "Review Session"

Content: Review of aims and design of study; procedure of experimental phase.

Method: Talk accompanied by slides of procedure (taken of Lewis Ward nurses and patients).

Discussion of forthcoming experimental phase and the nurse training programme.

Following the formal nurse training programme, training of nurses continued throughout the experimental phase by means of

supervised teaching during toileting sessions. During the first two weeks of the experimental phase each nurse was individually supervised by the researcher for a 4-hour period (half a shift). The nurse's performance in terms of toilet management and incontinence management was discussed continuously and recommendations made concerning technique. Positive reinforcement of the nurses' appropriate behaviours played a large part in supervised training.

As the study progressed, a few of the nurses themselves were instrumental in the supervision and training of their colleagues. This was essentially a self-selective process and an insidious one.

Two groups of students (R.M.N.) were seconded to the ward during the study. A four-hour training programme was provided to prepare them for involvement in the research activities.

Review meetings were held with nursing staff throughout the study in order to evaluate the patients' progress and to discuss problems requiring adaptation of procedures. Nurses used these meetings to discuss aspects of the implementation of the programme; and to request specific supervision or to suggest further discussion topics. A collection of books and papers was kept in the researcher's room for loan to nurses on request. An 'information corner' was set up in which publications or notices of direct relevance to the study were posted for the nurses' information.

In preparation for the Ward Sisters' greater involvement in, and responsibility for, Experiment II, further training and guidance was provided for these two nurses. This included instruction on the simple analysis of data from the records of elimination response rates; methods of isolating and evaluating reinforcers; supervision of nursing staff; and organisation of the programme.

(v) Aspects of nurses' involvement in the study:

The various aspects of nurses' involvement are noted in summary below:-

A. Data collection:-
   a. recording of elimination responses at Assessments 1 - 4 and during Experiments I and II.
   b. observation and recording of the toilet behaviour of patients in the experimental groups during Experiments I and II.
   c. recording of linen usage in Assessments 1 - 4.

B. Implementation of procedures during Experiments I and II:-
   a. toilet management of patients in experimental groups.
   b. management of incontinence of these patients.
   c. specific behaviour modification procedures in a and b.
   d. management of control group patients in Experiment I.

C. Attendance at nurse training programme sessions and review meetings; co-operation with the researcher to permit her undertaking of research activities (such as P-PAC assessments).

Although the study was designed and the research directed by the researcher, it is clear that the nursing staff were responsible for the implementation of the critical and major aspect, i.e. the experimental toilet training programmes. By its nature, the study could not have been carried out by one researcher or even a small research team. The responsibilities of the nurses for the collection of data were minimised as much as possible and the researcher undertook all 'backstage' work during the study. It seemed important for the researcher to maintain close contact with the nursing staff and to be present for as much of the time as possible. During the Assessments and throughout the Experiments, hours between 7.00a.m. and 10.00 p.m. were worked. The majority of interactions and communications between the researcher and the nursing staff related to the research study. Informal contact was limited to coffee and tea breaks and it was left to the nurses to initiate further contact.

CHAPTER 8:

METHOD (IV) - The Procedure.

Description and discussion of the procedure of the experimental study is provided in the following sections:-

1. Principles of the experimental procedure.
2. Definition and description of specific behaviour modification techniques employed.
3. Data collection procedures.
4. Method of replication (Experiment II) and long-term follow-up evaluation.
5. Application of the experimental procedure.
6. Miscellaneous procedural notes.

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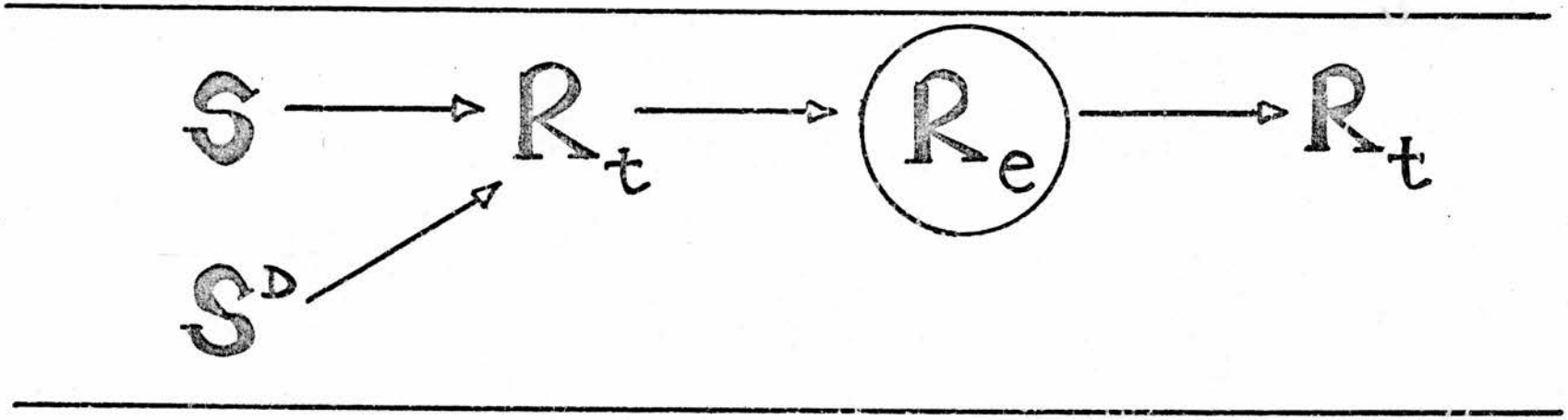
1. Principles of the experimental procedure.

The S-R reinforcement analysis of Ellis (1963) is previously detailed, as is the divergence in subsequent studies of toilet training entailing conditioning of the elimination response in the toilet and that entailing, in addition, the conditioning of associated toilet behaviours. The limitation of the former objective is that it does not involve the desired independent toileting ability of the patient. The procedure of the present study adopted the objective of independent toileting.

Perfunctory pilot observations were carried out in an attempt to analyse response topographies in toilet behaviour. The following definition of toilet behaviour was developed:-

Toilet behaviour comprises two reponse topographies. One involves the occurence of the elimination response (i.e. urination and/or defaecation) in the toilet. The other concerns responses which precede and follow the elimination response. Those which precede this (pre-elimination toilet skills) are (i) behaviour in




S : Physiological stimulus

$S^D$ : Discriminative stimulus

$R_e$ : Elimination response

$R_t$ : Pre- and post- elimination toilet skills

Figure 12 : Toilet behaviour as a response sequence.

response to the physiological stimulus of bladder or bowel contractions (i.e. going to the toilet or indicating the need to go); (ii) undressing; and (iii) sitting down on the toilet. Those which follow the elimination reponse (post-elimination toilet skills) are (i) getting up from the toilet; (ii) drying or cleaning; (iii) dressing; (iv) flushing the toilet; and (v) washing and drying hands.

Toilet behaviour therefore can be considered as a sequence of events. The elimination response ($R_e$) is central to this sequence. It occurs in response to a physiological stimulus (S). This involves the muscular contractions of the bladder or bowel, and results in an awareness of the need to eliminate. (Prior to voluntary control over the urethral and anal sphincters the elimination response may occur in response to certain 'cues' or discriminative stimuli ($S^D$), such as contact with the potty or toilet seat.) Response to the physiological stimulus is followed by the pre-elimination responses. Post-elimination responses follow the elimination response. The sequence of events in toilet behaviour can be diagramatically shown as in Figure 12.

On the basis of this functional analysis, the following definition of behaviour modification toilet training was adopted:-

> Behaviour modification toilet training involves the modification of toilet behaviour. That is, it involves the conditioning of the elimination response (Re) to occur in the toilet and the establishment of pre-and post- elimination toilet skills associated with Re.

It is forwarded that an individual can be considered to be 'toilet trained' when he has gained voluntary control over elimination and is independent in toilet behaviour. That is, he responds to the physiological stimulus consistently by voluntarily commencing and completing the sequence of behaviours which together make up toilet behaviour.

The procedure of toilet training in the experimental study is based upon the above definitions of toilet behaviour, toilet training and independent toileting. The final target behaviour of the programme was not concerned with post-elimination toilet skills (in order to set feasible objectives within the time available). The target behaviour was specified as follows:-

> 'That the patient goes to the toilet independently; removes his clothing independently; sits down on the toilet independently; and eliminates in the toilet (i.e. eliminates only in the toilet and is otherwise continent.)'

The repertoire of an incontinent mental defective minimally includes emission of the elimination response. Therefore toilet training focusses on this naturally-occuring response which is produced intermittently at a reasonably consistent rate. Conditioning of the elimination response aims to alter the contingencies to result in its occurence in the toilet rather than indiscriminately in other locations. Training therefore involves behaviour modification techniques to increase the frequency of appropriate behaviour (i.e. elimination in the toilet/continence) and to decrease the frequency of inappropriate behaviour (i.e. elimination outwith the toilet/incontinence). The technique applicable to the former is that of the presentation of positive reinforcement immediately following the appropriate response; and to the latter is that of withdrawal of positive reinforcement maintaining the inappropriate response (i.e. extinction).

The toilet skills associated with the elimination response are not normally a part of the behavioural repertoire of an incontinent mental defective; or, if present, are not temporally associated with the elimination response in the sequence of events of toilet behaviour. Acquisition and establishment of these skills can be brought about using behaviour modification techniques which develop complex behaviour patterns by the acquisition of simpler discrete

responses which collectively make up the complex behaviour. Shaping (successive approximation) and chaining (forward or backward) are such techniques.

Ellis (1963) subdivided toilet behaviour into 7 levels through which the technique of backward chaining could be applied. These are shown in Figure 13. During pilot study, this procedure was compared with observations of response topographies in the toilet behaviour of mental defectives who had been toilet trained and those being toilet trained. Two assumptions in the Ellis model were not supported by these observations. One was that there was no evidence that there is a chain of responses in toilet behaviour. Responses are temporally associated in the sequence of events involved, but whether or not they act in association as discriminative stimuli and reinforcers is dubious. The other assumption unsupported is that acquisition of the separate toilet skills (i.e. going, sitting, undressing) and of the elimination response in the toilet occurs at the same rate.

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VII Patient goes to toilet, removes clothing, sits down, eliminates.

VI Patient goes to toilet, is helped to remove clothing, sits, eliminates.

V Patient goes to toilet, is helped to remove clothing, is helped to sit, eliminates.

IV Patient 'asks' to go to toilet, is helped to remove clothing, is helped to sit, eliminates.

III Patient is taken to toilet, is helped to remove clothing, is helped to sit, eliminates.

II Patient is taken to toilet, is helped to remove clothing, is restrained to sit, eliminates.

I Patient is taken to toilet, is undressed, is restrained to sit, may/may not eliminate.

Figure 13:
Subdivision of toilet behaviour into 7 levels
(original outline of procedure; after Ellis, 1963).

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As a result of observations and considerations of the Ellis model, it was felt that to consider toilet behaviour as a chain would be inappropriate without pretesting of the precise association of responses involved. It was also considered that the various toilet skills were of varying degrees of difficulty and that a steady rate of acquisition of each concurrently could not be assumed. An attempt was made therefore to develop a 'model of shaping toilet behaviour', which would (i) consider the toilet skills and elimination response as discrete behaviours (associated temporally only); and (ii) provide a breakdown of each, involving successive approximations to the target behaviour. Figure 14 shows the model developed.

The model consists of the 3 pre-elimination toilet skills ('going', 'undressing', 'sitting') and the elimination response ('eliminating'). These 4 behaviour patterns comprise together the final target behaviour earlier specified. Each of these four areas includes two intermediate target behaviours and a base target behaviour and can be described as a shaping sequence. Shaping is applied through the successive approximations to the final target behaviour. (i.e. From the base target to the first-level and second-level intermediate targets respectively). This concept is illustrated in Figure 15.

The base target behaviours demand the least degree of independence of the patient and the greatest amount of intervention by the nurse. Working towards the final targets, patient independence is increased and nurse intervention withdrawn.

The model includes 16 target behaviours. The numbers are allocated notationally and do not reflect an overall shaping sequence. It is recognised that the breakdown is macroscopic rather than microscopic and each individual target itself could be further delineated.

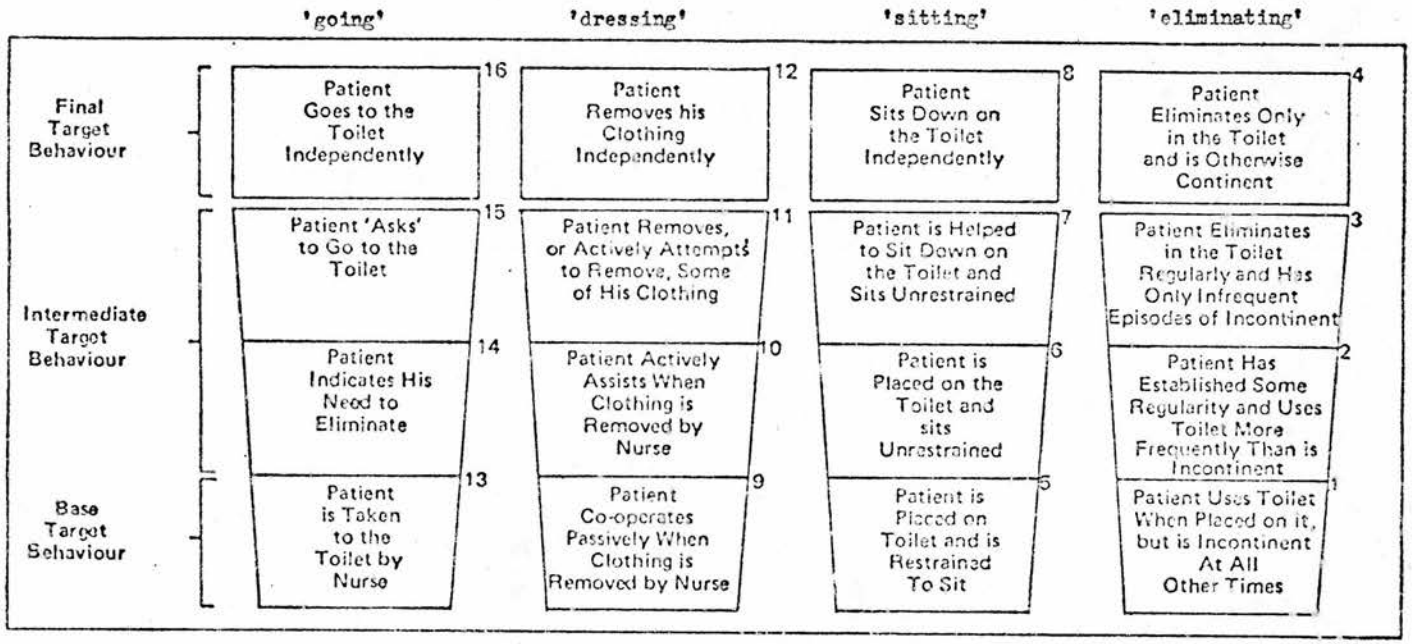


Figure 14 : 'Model of shaping toilet behaviour' .

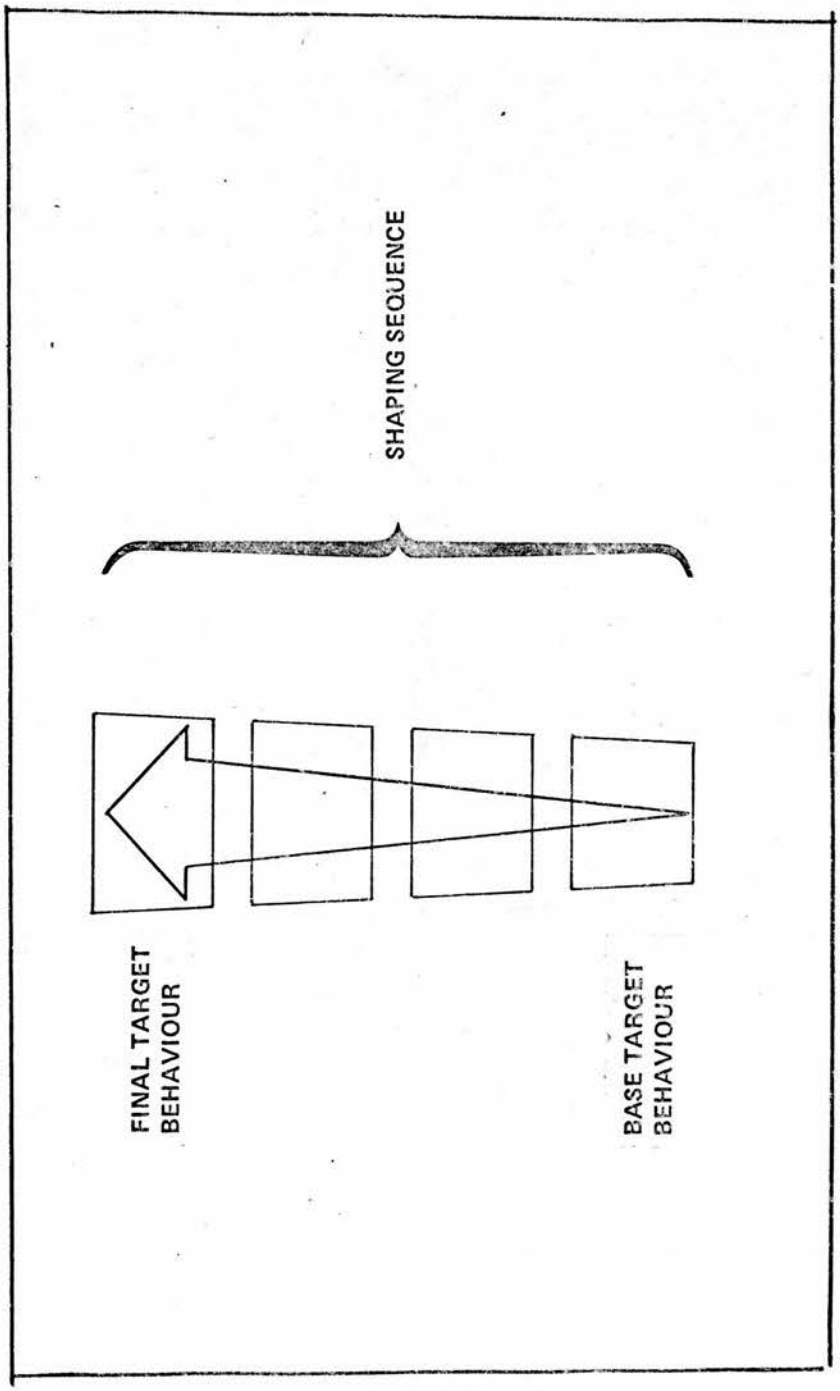


Figure 15 : A 'shaping sequence'.

The principles of behaviour modification toilet training can be summarised on the basis of the above discussion as follows:-

1. the elimination response (urination and defaecation) is conditioned through positive reinforcement to occur in response to appropriate physiological stimuli in the toilet;

2. the frequency of incontinence (elimination response outwith the toilet) is reduced through extinction;

3. toilet skills are established by behaviour shaping applied to successive approximations to the final target behaviour of these skills.

## 2. Behaviour modification techniques involved in toilet training

### (i) Behaviour shaping:

is "the gradual modification of some property of responses by the reinforcement of successive approximations to some criteria of an operant class to be established. Shaping is used to produce responses that, because of their low operant levels and/or their complexity, might not otherwise be emitted or might be emitted only after a considerable period of time. Shaping takes advantage of the fact that the variability of responses after one response has been reinforced usually provides an opportunity for reinforcement of a response that still more closely approximates the criteria of the to-be-established operant class." (Catania, 1968).

Behaviour shaping in the toilet training procedure of the present study was applied to the pre-elimination toilet skills and the elimination response as detailed according to the 'model of shaping toilet behaviour.' Positive reinforcement of the approximation involved at any point in training (i.e. the 'current target') was presented on a continuous reinforcement schedule (CRF) until the behaviour was established. An intermittent schedule (fixed-ratio; FR) was then adopted before reinforcement was no longer required. Reinforcers were individual to each patient and the conditions for reinforcer effectiveness met. Social approval was presented along with a primary or material reinforcer.

Positive reinforcement (social approval) was also given when the patient was found to be dry and/or not soiled (ie. had not been incontinent) when approached for a toileting session.

(ii) Other techniques applied in the shaping of toilet behaviour;

These included verbal instruction and graduated guidance (which can be considered as 'prompting techniques'), modeling and fading. These techniques provide the means of encouraging the patient to engage in the desired behaviour to allow its reinforcement. These are valuable adjuncts to shaping. Fading consists of the gradual withdrawal of prompts and is essential to prevent dependence upon a prompt as a discriminative stimuli without which the behaviour shaped would not be emitted. Gradual withdrawal is essential to prevent abrupt discontinuation of the behaviour, however (Shaeffer and Martin, 1975).

Clear and concise verbal instructions were given to patients in relation to all aspects of toilet training, despite absence of language in the majority of patients. Graduated guidance (physical guidance) was employed to enact the patient through all movements concerned in getting to the toilet, undressing and sitting down. Modeling was utilised particularly in relation to 'going' and 'sitting down', the objective being for the patient to imitate the nurse's demonstration of these actions. 'Gestural cuing' (after Gardner, 1971) was a frequently-used prompt. Obtaining direct eye contact with patients was a prerequisite for use of all prompting techniques. All appropriate responses to prompting were reinforced.

The fading of these aimed to reduce their completeness and their frequency. The various techniques tended to be employed simultaneously. Fading of physical guidance was effected first, and verbal instruction last.

(iii) Extinction:

involved the withdrawal or withholding of reinforcing consequences

of incontinent elimination. The responses maintaining incontinent behaviour were not analysed in individual patients. However, incontinence often resulted in attention from nursing staff. Changing of wet/soiled clothing usually constituted an opportunity for the nurses to talk to, or play with, the patients. These consequences may be considered as reinforcing. The extinction procedure adopted involved the withholding of nurses' attention following observed incontinence for a ten-minute period. During the changing of wet or soiled clothing nurses were instructed to remain 'neutral'. That is, potentially reinforcing behaviours (such as talking, smiling, physical contact, giving of toys) were minimised. No aversive consequences or punishment were employed, however.

(iv) Reinforcement of competing behaviours:

was a technique used to decrease the frequency of any inappropriate behaviour (other than incontinent elimination) which confounded the training procedure. For example, refusal to be undressed, getting up from the toilet too soon, and faecal smearing, were inappropriate behaviours encountered . Rather than punishing or extinguishing these, other 'competing' behaviours were shaped and reinforced. In the case of one patient who would urinate in the potty and then throw it over (thus preventing reinforcement of the appropriate urination), he was trained to empty the potty into the W.C. This provided an appropriate 'competing' behaviour which could be reinforced.

(v) Chaining:

is a technique employed to link (or chain) responses together into a behaviour pattern (or chain). The responses are linked together by stimulus events (discriminative stimuli) which serve both to reinforce the response elicited and to act as the stimulus

(or cue) for the next response in the chain. The intervening stimuli maintain their discriminative and reinforcing properties as a consequence of the reinforcement of the entire chain or behaviour pattern. Backward chaining was employed particularly in establishing the targets related to undressing.

(vi) Positive discrimination control:

was employed to bring particular behaviours under the control of specific stimulus events. Catania (1968) defines discrimination as "a difference that comes about as a consequence of differential reinforcement ... in the presence of different stimuli." Thus, when the behaviour occurs within the appropriate stimulus context, it is reinforced; when it occurs outwith this context, it is not reinforced. This technique provided a means for toilet behaviour to be encouraged to occur in the toilet annexe only, and in the toilet (or potty). For example, some patients, early in training, began to sit in a ward armchair to eliminate. This was not reinforced. The distinctive environmental cues in the toilet annexe provided the appropriate stimulus context. Reinforcement presented in that context only encouraged positive discrimination control over toilet behaviour.

(vii) Stimulus generalisation:

contrasts with discrimination in that it encourages behaviour to generalise across different stimulus situations. In toilet training it is essential to encourage this so that toilet behaviour will occur in a variety of appropriate stimulus contexts. Patients who attend off-ward activities require to generalise toilet behaviour to other environmental stimuli. In addition, patients should be able to respond to a variety of personnel.

Training was therefore continued in other departments and particular nurse-patient attachment was avoided in training.

3. Data collection procedures:

(i) Recording of elimination responses:

Elimination responses were recorded for the 52 patients of the total population during both 30-day phases, 24 hours per day, in Assessments 1 and 2.

Elimination responses were differentiated into incontinent eliminations (i.e. those eliminations occuring other than in the toilet) and toilet eliminations (i.e. those occuring in the toilet); and into urinary eliminations and faecel eliminations. Recording of elimination response included several factors. One was the time of the elimination response, from which the frequency of eliminations and their temporal pattern (i.e. distribution in time) could be calculated. Another was whether the response was considered to be 'nurse-initiated' or 'patient-initiated'. In the case of incontinent eliminations, a nurse-initiated response referred to the nurse discovering the incontinence; and a patient-initiated response to the patient notifying (verbally or non-verbally) the nurse of his incontinence. Finally, comments relevant to the response were recorded. These referred to behaviour concurrent with the elimination response, or behaviour preceding or following it immediately. The recording of elimination responses was made on a standard chart (see Appendix 1. 1.) The chart was completed by entering ticks in the appropriate spaces. A 2-day trial of recording was run prior to Assessment 1 to accustom the nurses to the procedure. Charts were kept on wall spaces close to the two toilet annexes and completed from note-sheets filled in by nurses after each patient

contact concerned. Teaching staff maintained records on those patients who attended school. Patients maintained in nappies continued to be so during recording phases as it was not possible to alter this practice. Recordings could be made therefore at regular changing times only.

Recordings between 7.00 a.m. and 10.00 p.m. were made by the day staff; and those between 10.00 p.m. and 7.00 a.m. by the night staff.

Throughout Experiments I and II recordings related to the research sample only and to the training period only ( 7.00 a.m. to 10.00 p.m.). These recordings were made on a different chart as shown in Appendix 1.2. This separated incontinent eliminations and eliminations in the toilet, and included recording that the procedures of extinction and reinforcement had been followed.

(ii) Observations of toilet behaviour:

During Assessment 1 observations were made (by the researcher) of behaviour associated with the elimination response to provide a behavioural analysis of incontinence and toilet behaviour of each patient. Observations were made during routine toileting sessions (toilet status Groups 1 and 2), routine nappy-changing sessions (Group 3 patients), and during various time periods in other locations of the ward. Observation schedules used for this behavioural analysis are contained in Appendix 1.3. Between 5 and 10 observations were made on each patient.

During Experiments I and II, and subsequent Assessments, observations of toilet behaviour were made within the framework of the 'model for shaping toilet behaviour'. Observations of the nurses and the researcher were discussed and patients' level of toilet ability assessed in terms of targets established within the four

areas of the model ('going'; 'undressing'; 'sitting'; 'eliminating').

(iii) Isolation of reinforcers:

During Assessment 1, patients in Groups 2 and 3 were studied and data collected in relation to the isolation of individual reinforcers. Three procedures were employed. Firstly, several nurses were asked to specify things known to have reinforcing and aversive properties for individual patients. Secondly, 'spot' observations were made on patients, and effective reinforcement incidents recorded. Thirdly, the reinforcing properties of potential or observed reinforcers were tested. (The P-PAC assessment procedure provided a major opportunity for this systematic testing). The response of the patient to various primary and secondary reinforces was recorded as 'positive', 'neutral', or 'negative'. Those obtaining a positive response were identified as individual reinforcers which could be employed in the training procedure. (The schedule used in this procedure is contained in Appendix 1.4.)

(iv) Assessment of patients on the Primary-Progress Assessment Chart.

Gunzburg's P-PAC tool was selected as the procedure by which to assess patients' general level of functioning on several accounts. It is suitable for nurses without experience in patient assessment to use, and was appropriate therefore for the researcher. As the assessment is fairly widely used in mental deficiency hospitals in this country, results pertaining to the research sample could be compared with other patient populations. The P-PACis suitable for severely handicapped patients and was appropriate for the patient group under study. Items in the assessment provide both quantitative and qualitative data. The assessment is designed to be repeated at 6-monthly intervals and this permitted the intermittent reassessment

of patients during the period of the study. P-PAC results can be compared with an accompanying evaluation index (the Progress Evaluation Index) to allow actual progress and expected progress to be evaluated. The P-PAC provides a visual impression of an individual's level of functioning and it was felt this would be an appropriate method of presentation of data to the nurses involved in the study. A copy of the P-PAC is contained in Appendix 1.5.

The assessment concerns a total of 130 discrete skills which are gained, in the normal child, during the first 3 years of normal social development. The skills are grouped under four headings - 'self-help', 'communication', 'socialisation' and 'occupation'. These groups each form one quadrant of the P-PAC diagram (circular in form). Within three of the quadrants there is a further grouping of skills into sub-sections ('eating', 'mobility', 'toilet and washing' and 'dressing' in the 'self-help' quadrant; 'from' and 'to' in the 'communication' quadrant; and 'dexterity' and 'agility' in the 'occupation' quadrant). In the diagram as a whole, the skills are arranged in order of maturational development, from the inside to the outside of the circular construction. There are six levels of development, notated a - f from inside to out on concentric circles. The 130 skills are numbered on the diagram from 1 - 130 (1 starting in level a and 130 finishing in level f). Scoring of the assessment of these 130 skills involves shading in on the diagram to represent skills which are performed easily/frequently, skills which are not yet acquired, and skills which cannot be assessed. Reassessments are made on new blank forms.

A Manual is available in which the criteria for scoring the assessment are detailed. These were adhered to closely in order to maximise validity and consistency in the assessments of different patients and different times.

The Progress Evaluation Index (P-P-E-I for the Primary PAC ; and P-E-I I for PAC1) is designed to record assessments made on one patient at six-monthly intervals over a 6-year period. The Index shows the development of an individual patient over this period and, in addition, shows a comparison of the individual's development with the 'average attainment levels' of a mental defective of comparable chronological age. The average levels are calculated from a sample of 156 severely mentally handicapped children. This sample was not statistically selected and cannot be considered a valid representative group. The 'average attainment levels' for different age groups are shown on the P-P-E-I by cross-hatching of appropriate spaces in the diagram. Ages 2 - 7 inclusive are represented and, with slight adjustment, ages 8 and 9 can also be compared. The index is completed by filling in the patient's assessment on the appropriate diagram (ignoring the cross-hatching). The evaluation is made by comparing the attainments of the individual with those of the 'average' attainments. If the shaded-in spaces correspond to the cross-hatching, the individual can be considered to be 'average'. If some of the cross-hatching is not shaded over, the individual is 'below average'. If shading-in covers spaces not cross-hatched, then the individual is 'above average.'

All 52 patients in the (initial) total population were assessed at Assessment 1. Patients in the research sample (experimental group I and its control group) were re-assessed at Assessments 2, 3 and 4 (intervals of approximately 6 months). All assessments were undertaken by the researcher and involved formal testing and informal observations. The Ward Sisters checked the results of the assessment and any dubiety was re-assessed.

(v) Assessment of Mental Age (M.A.):

The Cattell Infant Intelligence Scale was employed in the study to provide a measure of mental age (M.A.) from which, if appropriate, a measure of intelligence (I.Q.) can be calculated. The test is a downward extension of the revised Stanford Binet examination. All of the 52 patients in the total population were tested during the pre-experimental phase. The 36 patients in the research sample were re-tested in the post-experimental phase, an interval of approximately 6 months. The examination was undertaken by a clinical psychologist (Probationer Grade) who had received supervised practice with the test materials and procedure. Criteria of testing are after those laid down in the Manual (Cattell).

(vi) Recording of linen usage:

Linen, wet or soiled as a result of incontinent eliminations, was counted and the number of items of linen recorded during the 30-day pre- and post-experimental phases, (of Experiment I), 24 hours a day. The nurses were asked to put linen and clothing (and any material normally returned to the laundry) which was wet or soiled due to incontinence in a separate pile in the sluice of each toilet annexe. When the dirty laundry was normally packed, at two or three times in each shift, this separate pile was counted and the number of items of wet linen and the number of items of soiled linen entered on a record sheet maintained in the sluice. This task was frequently done by the researcher, although usually done by the day and night nursing staff. The recording form is contained in Appendix 1.6.

## 4. Replication (Experiment II) and Long-term Follow-up:

The research design of Experiment II is previously described. The experimental group (E . II) derived from the control group of Experiment I. This control group consisted of 18 patients. During Assessment 2, two of these patients (P 11 and P 38) were suffering from ill-health and, on this account, they were not included in the experimental group for Experiment II. The nursing staff requested inclusion of P 33. The experimental group (E II) of the replication therefore comprises 17 patients and differs slightly from the initial control group.

The procedure of Experiment II emulates that of Experiment I. Some inevitable differences are identified. The Experiment commenced 6 months later than the initial one and, therefore, patients involved had possible developmental gains. The nurses and patients in the experimental situation had become accustomed to the study and to the toilet training procedure. The nursing staff had the practical experience of the initial experiment. Some 'teething problems' of this had been resolved. In Experiment II the nursing staff assumed primary responsibility for the toilet training programme and the role of the researcher was diminished.

The Long-term follow-up evaluation comprised a 10-day data collection evaluative period. This occured almost 12 months following completion of Experiment I and 6 months after completion of Experiment II. Data collection included:-

(i) recording of elimination response rates of all patients in the total population;

(ii) assessment of the level of toilet behaviour (on the model) of patients of Experimental groups I and II;

(iii) P-PAC assessments of patients in the research Sample (n = 36) plus P33 (added to Experimental Group II).

## 5. Application of the experimental procedure in Experiments I and II:

The experimental procedure was applied for a period of 90 days in both experiments. The toilet training programmes were run daily (7 days a week) from 7.00 a.m. to 10.00 p.m. (the span of the day shifts). Training was undertaken mainly in the toilet annexes. No special equipment was employed; W.C.'s, potties and a commode were used. All nurses working in the ward were involved in the toilet training procedure. Domestic staff were not directly involved but were consulted in matters affecting them indirectly. The School teaching staff continued to apply the procedure to those experimental group patients who attended school. The researcher did not participate actively in the application of the procedure to patients but was available to organise, co-ordinate, supervise and evaluate the programme.

### (i) Formulation of procedure for patients in experimental groups.

Data collected in the pre-experimental assessment was used as the basis for formulating procedural details. A programme schedule was completed for each patient and current targets of training identified on the model for shaping toilet behaviour. The programme schedules included the following information:- note of the patient's toilet status (being potty trained/incontinent: as Groups 2 and 3); summary of baseline state of degree of incontinence and level in relation to toilet behaviour; pre- and post-elimination response patterns: instructions of toilet annexe (I or II), equipment (potty, W.C. or commode), nappies and special clothing: identification of reinforcers to be employed: toileting times. Two specimen programme schedules are included as illustrations (see Figures 16 and 17). The schedules were first completed for day 1

## • BEHAVIOUR MODIFICATION TOILET-TRAINING PROGRAMME •

NAME : John CODE : 01

COMMENCED : 2 2 0 9 7 2

### BASELINE DATA OF INCONTINENCE AND TOILET BEHAVIOUR :-

Group 2 - being potty trained. Able to perform all base targets, but remains incontinent and dependent on nurse. Has no toilet vocabulary and is non-verbal. Occasionally indicates need to urinate by holding genitals. Does not indicate when indontinent. Comprehends simple instructions ("Sit down" ; "Come" ; "No" ) but does not respond to questions (eg. "Do you want the toilet?"). Shows several inappropriate toilet behaviours - disrupts sessions, drinks from pot, throws pot; and may become hyperactive and difficult to control. Eliminates soon after meals and B.O. each morning. Is fully mobile.

### TRAINING ENVIRONMENT :- Toilet annexe II

### EQUIPMENT TO BE USED :- Potty

### DETAILS re USE OF NAPPIES (or OTHER CLOTHING) :-

NO nappy or protective pants. Underpants and shorts to be worn.
NO nappy at night.

### REINFORCERS :-

1. Social approval (cuddle, praise)
2. Drink of water from fountain
3. Smarties (3 or more)
4. Toy car

### TIMES TO BE TAKEN TO THE TOILET :-

| | ON RISING | AFTER BREAKFAST | MID-MORNING | AFTER LUNCH | MID-AFTERNOON | AFTER TEA | BATH TIME | BED TIME | FROM BED | DURING NIGHT | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (APPRX) | 7-8 | 9-9.30 | 10-10.30 | 12-1PM | 3-3.30 | 5-5.30 | 6-7 | 7-8PM | 9-9.30 | | | |
| | * | * | * | * | * | * | * | * | * | * | | |

### PROGRAMME AND PROGRESS REVIEWS :-

| | |
|---|---|
| DAY | |
| DAY | |
| DAY | |
| DAY | |
| DAY | |
| DAY | |

Figure 16 : Training Programme Schedule (Specimen A : P 01).

## • BEHAVIOUR MODIFICATION TOILET-TRAINING PROGRAMME •

NAME : Sean CODE : 22

COMMENCED : 2 2 0 9 7 2

### BASELINE DATA OF INCONTINENCE AND TOILET BEHAVIOUR :-

Group 3 - incontinent / has never been trained. Has no abilities at all in relation to toilet behaviour and continence. Has no vocabulary at all; does not respond to verbal communication (not even own name). No non-verbal cues identified in relation to elimination pattern. Immobile (no head control, cannot sit). Does not like personal contact.

### TRAINING ENVIRONMENT :- Toilet annexe 1

### EQUIPMENT TO BE USED :- Potty (small) plus full support.

### DETAILS re USE OF NAPPIES (& OTHER CLOTHING) :-

To be maintained in nappies day and night initially. These to be changed at usual times. Cat suit to be worn.

### REINFORCERS :-

No reinforcers isolated. Food, drinks, physical contact and toys to be avoided. Use social praise. Try musical or noise-producing toys (appears to like sounds)

### TIMES TO BE TAKEN TO THE TOILET :-

| | ON RISING | AFTER BREAKFAST | MID-MORNING | AFTER LUNCH | MID-AFTERNOON | AFTER TEA | BATH TIME | BED TIME | FROM BED | DURING NIGHT | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (APPX) | 7-8 | 9-9.30 | 10.30-11 | 12-1PM | 3-3.30 | 5-5.30 | 6-7 | 7-8PM | 9-9.30 | | | |
| | | * | | * | | * | | | | | | |

### PROGRAMME AND PROGRESS REVIEWS :-

| | |
|---|---|
| DAY | |
| DAY | |
| DAY | |
| DAY | |
| DAY | |
| DAY | |

Figure 17 : Training Programme Schedule (Specimen B : P 22)

of the experimental phase and up-dated at regular intervals.

A similar procedure was followed in the setting of targets on the model for shaping toilet behaviour. Targets were designated as 'current targets' to indicate the focus of training at any time (and this implied the adoption of a continuous reinforcement schedule). These were considered to be 'established' when (a) observations confirmed that the target behaviour was met consistently and with minimal prompting and (b) when nurses felt that the patient was able to be moved on to the next target. Two specimen models are included (see Figures 18 and 19). That of P 01 shows the 4 base targets to have been established prior to day 1 and targets related to 'sitting' and 'eliminating' set at the intermediate level. P 22's model shows 3 base targets to have been set on day 1 of training.

The programme schedules and models were completed for each patient at the start of training as the formulation of the procedure. They were displayed on wall space near the toilet annexes and thus provided the nurse with the information required in implementing the toilet training procedure. Updating of the schedules and review of the targets on the model, in addition to providing up-to-date information, served to provide an indication of the progress of patients in respect of the objectives of training. Data from the records of incontinent and continent elimination responses were graphed and the cumulative records displayed along with the schedules and models.

(ii) The toilet training routine:

relating to the establishment of the elimination response in the toilet and the shaping of pre-elimination toilet skills involved a

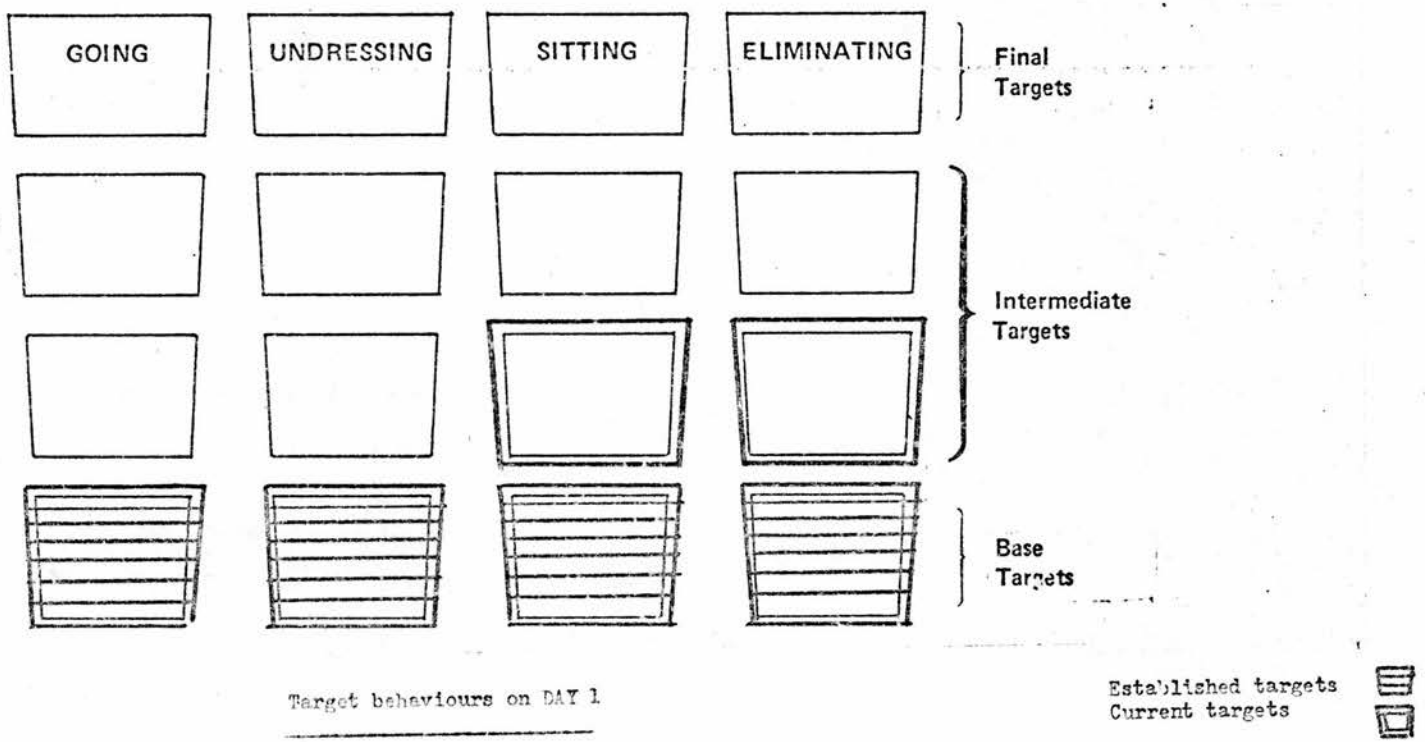


Figure 18 : Behaviour Shaping Model (P 01 )

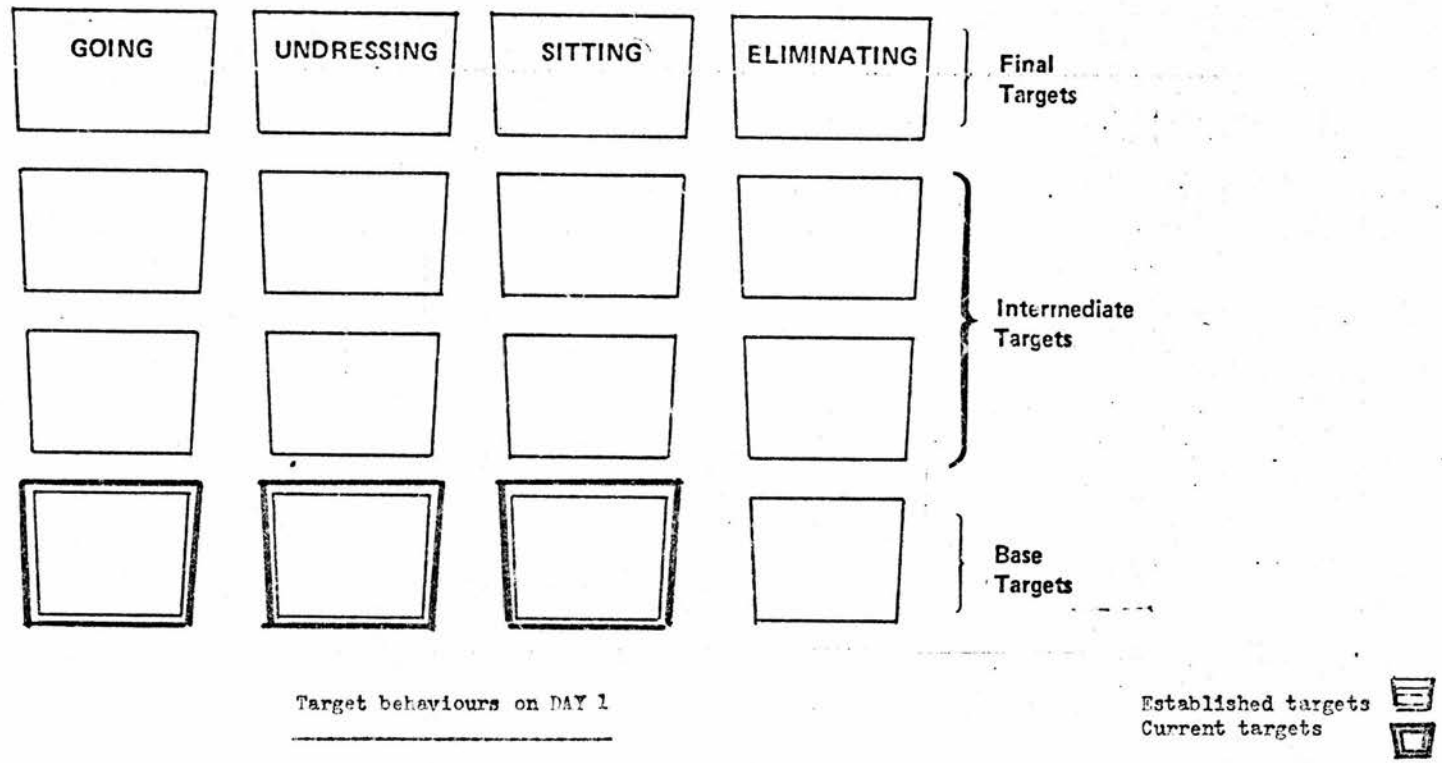


Figure 19 : Behaviour Shaping Model (P 22 )

specified number of nurse-initiated toilet sessions per day. The timing of these was indicated for individual patients on the programme schedules. These times were identified to accomodate any temporal pattern of elimination evident in pre-experimental data, to follow mealtimes and to fit into the ward routine. Patients previously included in potty training (Group 2 patients) commenced on a routine of frequent toileting. (8 - 10 sessions per day). Those who had never been toileted were commenced on an infrequent routine (2 - 6 sessions per day). The number of sessions was gradually increased to the maximum of 10 per day and then gradually reduced as increased bladder capacity and sphincter control was evidenced by the absence of incontinence within longer between-toileting intervals. To remind nurses of the toileting schedule a 'timetable' was displayed. (an example of this is shown in Figure 20).

The toilet training routine was nurse-initiated. However, any indications of need to eliminate displayed by patients ('patient-initiated') were responded to by a toileting session.

A maximum of five patients were contained in the toilet annexe at any one time. At least one nurse was required to be present with them throughout the toileting session. The procedure eventually adopted was for a session to be conducted by two nurses. One would prepare the annexe (by putting out potties and reinforcers) while the other collected a patient from the day-room and follow the training procedure related to the 'going' targets. The patient was then handed over to the nurse remaining in the annexe to deal with the 'dressing', 'sitting' and 'eliminating' targets. By the time this patient was sitting on the toilet, the next patient would have arrived with the other nurse ... and so on. Both nurses were available to complete the toileting session together. A single session involving

TOILET ANNEXE I

Days 1 - 10

| | 7-8 | 9-9.30 | 10.30 | 12-1 | 3-3.30 | 5-5.30 | 6-7 | 9-9.30 | 12.00 | other |
|---|---|---|---|---|---|---|---|---|---|---|
| EXP. GROUP | On rising | After break. | Mid-morn. | After lunch | After tea | Bath time | Bed time | From bed | During night | |
| 53 | * | * | * | * | * | * | * | * | * | |
| 40 | * | * | * | * | * | * | * | * | * | 4 am |
| 49 | * | * | * | * | * | * | * | * | * | |
| 26 | | * | | * | | * | * | | | |
| 22 | | | * | * | | * | | | | |
| 19 | | * | * | * | | * | | | | |
| 36 | | * | * | * | | | | | | |
| 44 | | * | * | * | | | | | | |
| 18 | * | * | * | | | * | | | | |
| 29 | | * | * | * | * | * | * | | | |

Figure 20 : Toileting Session Schedule.

all experimental group patients (approximately 9 per annexe) would last between 30 and 50 minutes on average. Patients were not kept sitting on the toilet for more than 10 minutes.

The main functions of the regular toileting sessions, as the focus of the toilet training procedure, were to establish patients' adaptation to the sequence of events in toilet behaviour and to aid acquisition of bladder and bowel control. Frequent toileting served to increase the probability of the occurence of the desired response (i.e. elimination in the toilet) and thus provide the opportunity for reinforcement of that response.

(iii) Stages in training:

In retrospect, four stages involved in the progression of the toilet training procedure can be identified. These are:-

a. a period of adaptation training.

b. concentration on the establishment of the elimination response in the toilet.

c. concentration on the shaping of pre-elimination toilet skills.

d. maintenance training.

Most of the patients who had been being potty trained previously did not require adaptation training. This related to getting the patients to become accustomed to, and co-operative in, being taken to the toilet and taken through the sequence of events involved in toilet behaviour. This corresponded to the base targets on the model. Patients were not expected to display much independent toilet behaviour and nursing intervention was at its maximum. All possible prompting techniques were employed and immediate reinforcement presented following any appropriate behaviour (essentially co-operative responses) and any approximation to desired behaviours. Patients were kept in nappies during this stage of training. A dry and clean nappy was reinforced, and the extinction procedure relating to incontinence strictly followed.

The patients were kept sitting on the toilet for only a short time (5 - 10 minutes) and this behaviour reinforced. If elimination in the toilet did occur. this was quickly detected (visual, auditory and olfactory observations proved to be adequate and accurate) and immediately reinforced. During adaptation training care was taken to ensure that toileting sessions were pleasant and enjoyable for the patient. Potentially aversive incidents (such as discomfort from prolonged sitting) were avoided.

Once the patient had met some, or all, of the base targets and would co-operate in being taken to the toilet, the second stage in training was commenced. This concentrated upon the establishment of the elimination response in the toilet. More frequent toileting was introduced; and an attempt made to toilet the patient immediately following completion of meals, following any observed cue indicating need to eliminate, and accomodating any identified temporal pattern of elimination (particularly faecal). Positive reinforcement following elimination in the toilet was the most essential feature of procedure in this stage. In a few cases, urination frequency was artifically increased by giving the patient extra fluid. Once the frequency of elimination in the toilet had been increased, nappies were usually dispensed with. This permitted much more effective application of the extinction of incontinence procedure. Following the nonreinforcement period, patients were immediately toileted as the conclusion to an episode of incontinence.

Concentration on the shaping of pre-elimination toilet skills then comprised the third stage in training. Shaping of targets in the 'going' area of the model proved to be most difficult for the nurses, and to produce the fewest opportunities for reinforcement.

Maximum prompting by simple verbal instruction and explanation and physical guidance was continued and any response obtained was reinforced. Shaping, and chaining of dressing responses was continued, and prompts gradually faded out. Independent sitting was encouraged by modelling and physical guidance. Training of pre-elimination toilet skills was carried out in ways particularly appropriate to individual patients.

Maintenance training, as the fourth stage in training, continued well beyond the experimental phase and was related to the level of toilet behaviour achieved. In many cases, this continuing training was as much continued training and remedial training as maintenance training.

(iv) An example of procedure in a training session:

To illustrate some of the procedural aspects, one example of a training session is provided. This concerns a young, ambulant patient who has established the base targets on the model (i.e. has completed 'adaptation training').

The nurse approaches John in the day-room after lunch. He is sitting on the floor, rocking backwards and forwards. She observes that has wet himself, and turns away quickly and deliberately. After 15 minutes she returns to him, picks him up and carries him to the toilet annexe. Without making eye contact, talking to or reinforcing him, she removes his wet clothes quickly. (This constitutes correct application of the extinction procedure following incontinence).

The nurse puts John down on the floor, obtains eye contact and says clearly: "John, toilet." He looks up and she smiles and says "Good, boy! ". She then takes his hand and guides him to the potty. She praises his co-operation and then says, "Sit down on the potty, John". (His clothes have already been removed during changing). As he does not respond she puts her hands on his hips and repeats the

instruction as he is guided to sit down. When he is sitting, she praises him and gives him a sweet. Nurse then says. "Go to the toilet, John." While he is sitting on the potty, the nurse talks to him and keeps him occupied. After a few minutes she hears that he is urinating and says "Good boy!" When he is finished, he is praised again, given a sweet, praised while being shown the contents of the potty and then given a lot of attention while being dressed by the nurse and returned to the day-room. (This illustrates appropriate application of shaping 'sitting' behaviour by prompting and reinforcing elimination in the toilet).

Had John not been observed to have been incontinent when the nurse approached, she would have commenced the training session differently. She would obtain eye contact and say "John, come to the toilet". If no response ensued, she would model the behaviour by walking towards the door to the toilet annexe, repeating the instruction. If John does not then respond she would prompt by physical guidance and reinforce his co-operation. Once in the toilet annexe, he would be praised verbally and guided to the potty. The nurse would instruct, "Trousers down, John ". If prompting is required, physical guidance would be used. The nurse would place her hands over his and guide the trousers down, removing hers before the action is complete. Reinforcement would be given throughout this procedure.

(Some aspects of the adaptation of the behaviour modification training programme to individual patients can be appreciated from the description of procedure in the Tape/Slide sequence on 'Toilet Training' (Tierney, 1975). The third part of the sequence shows the various implementations of procedure with three patients involved in the study.)

6. Miscellaneous procedural notes:

(i) Management of experimental group patients (EI and EII) during Experiments I and II:

During the period of the programme no changes in the management of these patients were introduced other than those directly related to the management of incontinence and toilet behaviour. The nursing staff was instructed to maintain their previous management policies and routines and to treat the experimental group as part of the ward population in all respects with the exception of the toilet training procedure. The patients were not identified in any way to prevent their discrimination in the ward. As is noted earlier, no special restrictions were placed on the patients' activities.

(ii) Management of control group patients (C I) (and other patients not included in the research sample) during Experiment I:

34 patients of the total population ( N = 52) were not involved in the toilet training programme during its 90-day period. It was therefore important that the procedure of the programme was designed to accomodate to the ward routine and not to disrupt the life in the ward as a whole. The nursing staff were instructed to continue to manage the patients in every way as they had done previously. The Ward Sisters assumed the responsibility of ensuring that this was done. This was particularly important in meeting a condition of the experimental design that all environmental variables were equally spread across the experimental and control groups.

Equally important was to ensure that the independent variable (the behaviour modification toilet training programme) was applied to the experimental group only and not to the control group. This posed a particular problem in respect of the sub-group within the control group consisting of those patients who had previously been potty trained.

The nurses were instructed to "continue potty training in their traditional way" with this group. In an attempt to ensure that this was done a competitive situation was contrived. The researcher suggested that the experimental procedure and the nurses' potty training procedure should compete to see if the former was, in fact, superior. The nurses (who retained faith in their conventional habit-training method) welcomed this, and agreed to keep to the 'rules' of the competition. An additional precaution was, whenever possible, to toilet the experimental group separately from non-experimental group patients. After the selection procedure, the control group was not identified further. This was an attempt to reduce discrimination to patients in this group. Few problems were anticipated in the management of incontinence of non-experimental group patients and the non-reinforcement period was not applied outwith the experimental group. The researcher instituted a careful procedure of differential reinforcement of nursing staff to further safeguard the situation. Nurses were reinforced when observed (or when they reported) to implement the experimental procedure with the experimental group patients appropriately or with success. When they reported the application of experimental procedures to control group patients they were not reinforced (but given a 'cold shoulder'). When they were observed to do so, during 'spot checks' at their pottying sessions, they were rebuked (this being a 'rule' of the competition. )

(iii) Management of the environment:

To maintain the conditions required for the experimental situation to be a representative one, no attempt was made to provide stimulus control within the ward. No alterations to the environment were made. No additional resources were obtained with the exception of an increased clothes' stock and improved laundry service. The ward was not isolated from the rest of the hospital, and access remained

open to visitors and staff visits. Visitation on account of the study only were not encouraged, however.

An environmental feature of distinct disadvantage to the training programme was the lack of free access to the toilet annexes from the dayroom. The intervening doors required to be kept locked on account of their potential hazard to patients. The doors were glass-plated swing doors and were unsafe because fingers could be easily trapped and patients knocked down by the weight of the doors when swinging shut. The low nurse:patient ratio did not allow the extra supervision of patients which would have been required had the doorway been opened.

(iv) Management of Experimental group I during Experiment II:

Behaviour modification toilet training was continued for patients in this group during the period of Experiment II. This consisted essentially of a less intensive maintenance of training programme. Continuous recording of elimination response rates was discontinued, but the models were maintained. Patients in experimental group II were given priority in toileting sessions; and E I and E II patients toileted separately during this period.

(v) Review meetings:

were held at 10-day intervals throughout Experiments I and II. Programme schedules and models were updated. In addition the following evaluations were made in relation to procedure and patient progress:-

a. Acquisition of other toilet behaviours (i.e. those not included on the model) - vocabulary, comprehension, post-elimination toilet skills.

b. Attention to mobility status of patients with impaired mobility in relation to use of equipment.

c. Decisions regarding use of nappies.

d. Evaluation of effectiveness of reinforcers in use.

e. Review of toileting sessions' schedule.

f. Discussion of development of any inappropriate toilet behaviours or other procedural problems.

g. Review of cumulative records of elimination response rates to assess decrease of incontinence.

(vi) Management of patients during Assessment periods:

During Assessment periods (1 - 4), although the formal experimental phase of toilet training was completed, toilet training of the relevant groups of patients was continued. Post-experimental assessments were not intended to involve a return to baseline (pre-experimental) conditions as would be instituted in a reversal design.

CHAPTER 9:

RESULTS (I) - Results of Experiment I

1. Results pertaining to the experimental group (E I):-
   (i) Reduction in incontinence.
   (ii) Improvement in toilet behaviour
   (iii) Improvement in general level of functioning.
2. Results pertaining to the control group (C.I.)
3. Comparison of results pertaining to the control groups and those pertaining to the experimental group.

1. Results pertaining to the experimental group (E.I.):-

(i) Reduction in incontinence:

A Reduction in the frequency of incontinent elimination responses:-

Data gained from the recording of elimination response rates in the pre- and post-experimental phases for the experimental group (E I) is contained in full in Appendix 2. Data are shown for each patient on each of the 30 days of recording in each phase, each day being taken as a 24 hour period (7.00 a.m. to 7.00 a.m.). Tables 28 - 36 and Figure 21 are derived from these raw data.

Comparison of the total number of elimination responses (incontinent eliminations and eliminations in the toilet) is shown in Table 28. The total number of elimination responses is 3074 in the pre-experimental phase, and 4796 in the post-experimental phase. This represents an increase in the number of eliminations in the toilet (increase of 2835; from 723 to 3558); and a decrease in the number of incontinent eliminations (decrease of 1113; from 2351 to 1238).

Table 28: Comparison of total number of elimination responses (incontinent and toilet) in the experimental group (E I) at the pre- and post-experimental phases.

| Elimination responses | Pre-Exp. | Post-Exp. | Difference |
|---|---|---|---|
| Number of incontinent eliminations | 2351 | 1238 | -1113 |
| Number of eliminations in the toilet | 723 | 3558 | +2835 |
| Total number elimination responses | 3074 | 4796 | +1722 |

Table 29: Percentage of incontinent eliminations and eliminations in the toilet in the experimental group (E I) at the pre- and post-experimental phases.

| Elimination Responses | Pre-Exp. | | Post-Exp. | |
|---|---|---|---|---|
| | N | % | N | % |
| All elimination responses | 3074 | 100 | 4796 | 100 |
| Incontinent eliminations | 2351 | 76.48 | 1238 | 35.81 |
| Eliminations in toilet | 723 | 23.52 | 3558 | 74.19 |

Table 30: Average number of elimination responses per day in the the total experimental group (E I), (n = 18), during the pre- and post-experimental phases (30 days)

| Elimination Responses | Number | | Daily average | |
|---|---|---|---|---|
| | Pre-Exp. | Post-Exp. | Pre-Exp. | Post-Exp. |
| All elimination responses | 3074 | 4796 | 102.46 | 159.86 |
| Incontinent eliminations | 2351 | 1238 | 78.36 | 41.26 |
| Eliminations in toilet | 723 | 3558 | 24.10 | 118.60 |

Incontinent eliminations account for 76.48% of all eliminations in the pre-experimental phase and for 25.81% in the post-experimental phase. Eliminations in the toilet account for 23.52% of all eliminations in the pre-experimental phase, and for 74.19% in the post-experimental phase (see Table 29). Thus, looking at overall elimination response rates, there is a decrease in the frequency of incontinent elimination responses and an increase in the frequency of elimination responses in the toilet.

These figures also show an overall increase in the frequency of elimination responses (all eliminations). This increase is reflected in these total figures as well as in the average response frequency per day in the post-experimental phase (see Table 30). In the pre-experimental phase, the average number of elimination reponses per day for the experimental group is 102.46. In the post-experimental phase, it is 159.86. The average number of incontinent eliminations is 78.36 in the pre-experimental phase and decreased to 41.26 in the post-experimental phase. There is an increase in the average number of elimination responses in the toilet per day in the post-experimental phase

to 118.60 (from 24.10 in the pre-experimental phase).

Tables 31 and 32 show the number and the average number per patient of elimination responses respectively on each of the 30 days of the pre-and post experimental phases. In the pre-experimental phase, the number of elimination responses per day ranges from 82 to 119; and the average number per patient from 5.2 to 7.0. Of these, the number of incontinent eliminations ranges from 65 to 91; the average number per patient from 3.6 to 5.3 The number of eliminations in the toilet ranges from 15 to 34; the average number per patient ranges from 0.9 to 2.0. In the post-experimental phase, the number of elimination responses per day ranges from 141 - 178; the average number per patient from 7.8 to 9.9. Of these, the number of incontinent eliminations ranges from 28 to 49; the average number per patient from 1.6 to 2.9; and the number of eliminations in the toilet ranges from 102 to 137, with the average number per patient ranging from 5.4 to 7.6 These figures show that there is a fairly equal distribution of response frequency throughout both the pre- and post-experimental phases in the experimental group. The range in the number of all elimination responses per day is equal in both phases (range = 37) and in the average number per day is almost equal (range is 1.8 in pre-exp. and 2.1 in post-exp. phase). Similar equality is seen in the range in number (26 in pre-exp. and 21 in post-exp.) and in average number (1.7 in pre-exp. and 1.3 in post-exp.) of the incontinent elimination response rates. A difference is evident with respect to eliminations in the toilet, the range in number and average number both being greater in the post-experimental phase (range in number per day being 19 in pre-exp. and 35 in post-exp; range in average number per day being 1.1 in pre-exp. and 2.2 in post - exp.).

Similar calculations are presented in Tables 33 and 34 in respect of individual patients in the experimental group (rather than calculations referring to the whole group on the days of the recording phases). Table 33 shows the number of all elimination responses, incontinent eliminations and eliminations in the toilet for each patient on each day of the pre- and post-experimental phases. Table 34 shows the average number of these responses per day, (this being required on account of full recording not being obtained in the pre-experimental phase on some patients.) These data show a division within the group in both phases. In the pre-experimental phase the division is between patients of pairs 1 - 5 inclusive and those of pairs 6 - 18 inclusive. The first sub-group comprises those patients previously assigned to toilet status group 2 (i.e. "being potty trained"), and the second sub-group those in toilet status group 3 (i.e. "incontinent"). In the first group, in the pre-experimental phase, there is a higher average response rate overall per day (ranging from 7.4 to 11.0 elimination responses per day) than in the second group (4.7 to 5.3 elimination responses per day). In addition, there is a negligibly higher response rate of eliminations in the toilet (2.9 - 7.3 per day) in this first group than that in the second group, (0.0 to 0.3)

In the post-experimental phase, the division is between patients of pairs 1 - 14 inclusive and those of pairs 15 - 18 inclusive. The first larger sub-group (14 patients) comprises those who show a decrease in the average number of incontinent eliminations per day and an increase in the average number of eliminations in the toilet per day. The second smaller sub-group (4 patients) comprises those patients whose average number of incontinent eliminations per day remains unchanged or is increased only marginally.

Tables 33 and 34 also provide explanation for the overall increase

Table 31 : Numbers of elimination responses per day in the total experimental group (EI:n=18) during the pre- and post- experimental phases. (30 days)

| Day | No. of Patients | | All elimination responses | | Incontinent eliminations | | Eliminations in the toilet | |
|---|---|---|---|---|---|---|---|---|
| | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. |
| 1 | 17 | 18 | 99 | 151 | 69 | 49 | 30 | 102 |
| 2 | 17 | 18 | 115 | 151 | 81 | 53 | 34 | 98 |
| 3 | 17 | 18 | 100 | 164 | 76 | 52 | 24 | 112 |
| 4 | 17 | 18 | 103 | 160 | 79 | 47 | 24 | 113 |
| 5 | 17 | 18 | 106 | 150 | 83 | 37 | 23 | 113 |
| 6 | 17 | 18 | 96 | 157 | 79 | 49 | 17 | 108 |
| 7 | 17 | 18 | 104 | 141 | 81 | 39 | 23 | 102 |
| 8 | 17 | 18 | 94 | 168 | 74 | 48 | 20 | 120 |
| 9 | 17 | 18 | 105 | 159 | 86 | 88 | 19 | 121 |
| 10 | 17 | 18 | 102 | 168 | 74 | 41 | 28 | 127 |
| 11 | 17 | 18 | 101 | 165 | 76 | 42 | 25 | 123 |
| 12 | 17 | 18 | 92 | 159 | 74 | 41 | 18 | 118 |
| 13 | 17 | 18 | 119 | 169 | 91 | 47 | 28 | 122 |
| 14 | 17 | 18 | 103 | 159 | 78 | 41 | 25 | 118 |
| 15 | 17 | 18 | 109 | 156 | 89 | 30 | 20 | 126 |
| 16 | 17 | 18 | 111 | 153 | 78 | 43 | 33 | 110 |
| 17 | 17 | 18 | 110 | 169 | 88 | 40 | 22 | 129 |
| 18 | 18 | 18 | 110 | 178 | 83 | 42 | 27 | 136 |
| 19 | 18 | 18 | 97 | 165 | 65 | 39 | 32 | 126 |
| 20 | 17 | 18 | 98 | 154 | 74 | 40 | 24 | 114 |
| 21 | 18 | 18 | 110 | 168 | 78 | 46 | 32 | 122 |
| 22 | 17 | 18 | 102 | 144 | 84 | 30 | 18 | 114 |
| 23 | 17 | 18 | 94 | 160 | 74 | 37 | 20 | 123 |
| 24 | 17 | 18 | 108 | 160 | 79 | 42 | 29 | 118 |
| 25 | 18 | 18 | 106 | 154 | 78 | 41 | 28 | 113 |
| 26 | 17 | 18 | 105 | 163 | 80 | 43 | 25 | 120 |
| 27 | 17 | 18 | 99 | 171 | 82 | 43 | 17 | 128 |
| 28 | 17 | 18 | 105 | 171 | 77 | 34 | 28 | 137 |
| 29 | 17 | 18 | 89 | 155 | 74 | 36 | 15 | 119 |
| 30 | 15 | 18 | 82 | 154 | 67 | 28 | 15 | 126 |

Table 32 : Average number of elimination responses per patient per day of the experimental group (EI) during pre- and post-experimental phases (30 days).

| DAY | AVERAGE No. ELIMINATION RESPONSES PER PATIENT | | | | | |
|---|---|---|---|---|---|---|
| | ALL ELIMINATION RESPONSES | | INCONTINENT ELIMINATIONS | | ELIMINATIONS IN TOILET | |
| | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. |
| 1 | 5·8 | 8·3 | 4·0 | 2·7 | 1·7 | 5·6 |
| 2 | 6·7 | 8·3 | 4·8 | 2·9 | 2·0 | 5·4 |
| 3 | 5·8 | 9·1 | 4·5 | 2·8 | 1·4 | 6·2 |
| 4 | 6·0 | 8·8 | 4·6 | 2·6 | 1·4 | 6·3 |
| 5 | 6·2 | 8·3 | 4·9 | 2·0 | 1·3 | 6·3 |
| 6 | 5·6 | 8·7 | 4·6 | 2·7 | 1·0 | 6·0 |
| 7 | 6·1 | 7·8 | 4·8 | 2·2 | 1·3 | 5·6 |
| 8 | 5·5 | 9·3 | 4·4 | 2·6 | 1·2 | 6·6 |
| 9 | 6·1 | 8·8 | 5·1 | 2·1 | 1·1 | 6·7 |
| 10 | 6·0 | 9·3 | 4·4 | 2·3 | 1·6 | 7·1 |
| 11 | 5·9 | 9·2 | 4·5 | 2·3 | 1·5 | 6·8 |
| 12 | 5·4 | 8·8 | 4·4 | 2·3 | 1·1 | 6·5 |
| 13 | 7·0 | 9·4 | 5·3 | 2·6 | 1·6 | 6·7 |
| 14 | 6·1 | 8·8 | 4·6 | 2·3 | 1·5 | 6·5 |
| 15 | 6·4 | 8·6 | 5·2 | 1·6 | 1·2 | 7·0 |
| 16 | 6·5 | 8·5 | 4·6 | 2·4 | 1·9 | 6·1 |
| 17 | 6·5 | 9·4 | 5·2 | 2·2 | 1·3 | 7·2 |
| 18 | 6·1 | 9·9 | 4·6 | 2·3 | 1·5 | 7·5 |
| 19 | 5·4 | 9·2 | 3·6 | 2·2 | 1·8 | 7·0 |
| 20 | 5·8 | 8·5 | 4·4 | 2·2 | 1·4 | 6·3 |
| 21 | 6·1 | 9·3 | 4·3 | 2·5 | 1·8 | 6·8 |
| 22 | 6·0 | 8·0 | 4·9 | 1·7 | 1·1 | 6·3 |
| 23 | 5·5 | 8·9 | 4·4 | 2·1 | 1·2 | 6·8 |
| 24 | 6·4 | 8·9 | 4·6 | 2·3 | 1·7 | 6·6 |
| 25 | 5·9 | 8·6 | 4·3 | 2·3 | 1·6 | 6·3 |
| 26 | 6·2 | 9·1 | 4·7 | 2·4 | 1·5 | 6·7 |
| 27 | 5·8 | 9·5 | 4·8 | 2·4 | 1·0 | 7·1 |
| 28 | 6·1 | 9·5 | 4·5 | 1·9 | 1·6 | 7·6 |
| 29 | 5·2 | 8·6 | 4·4 | 2·0 | 0·9 | 6·6 |
| 30 | 5·5 | 8·6 | 4·5 | 1·6 | 1·0 | 7·0 |

Table 33 : Total numbers of elimination responses (all eliminations, incontinent eliminations and eliminations in the toilet) of the patients in the experimental group (EI) at the pre- and post-experimental phases. (30 days)

| PATIENT | | All elimination responses | | Incontinent eliminations | | Eliminations in the toilet | |
|---|---|---|---|---|---|---|---|
| Pair | Code | Pre-exp. | Post-exp.. | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. |
| 1 | 53 | 114 * | 262 | 28 | 4 | 86 | 258 |
| 2 | 40 | 320 | 279 | 107 | 19 | 213 | 260 |
| 3 | 49 | 279 | 291 | 77 | 29 | 202 | 262 |
| 4 | 01 | 178 * | 307 | 107 | 40 | 71 | 267 |
| 5 | 05 | 256 | 327 | 157 | 67 | 99 | 260 |
| 6 | 26 | 149 | 300 | 146 | 35 | 3 | 265 |
| 7 | 22 | 140 | 291 | 134 | 22 | 6 | 269 |
| 8 | 19 | 133 | 293 | 129 | 43 | 4 | 250 |
| 9 | 18 | 147 | 301 | 139 | 23 | 8 | 278 |
| 10 | 28 | 152 | 308 | 148 | 26 | 4 | 282 |
| 11 | 04 | 151 | 292 | 150 | 51 | 1 | 241 |
| 12 | 10 | 149 | 293 | 145 | 74 | 4 | 219 |
| 13 | 48 | 162 | 299 | 156 | 85 | 6 | 214 |
| 14 | 45 | 142 | 296 | 139 | 79 | 3 | 217 |
| 15 | 36 | 146 | 155 | 141 | 155 | 5 | 0 |
| 16 | 44 | 149 | 158 | 146 | 147 | 3 | 11 |
| 17 | 27 | 160 | 168 | 155 | 166 | 5 | 2 |
| 18 | 02 | 147 | 176 | 147 | 173 | 0 | 3 |
| | TOTALS: | 3074 | 4796 | 2351 | 1238 | 723 | 3558 |

* Incomplete recording.

Table 34 : Average number of elimination responses per patient of the experimental group (EI) per day during the pre- and post-experimental phases. (30 days)

| Patient | | No. of days of recording | | AVERAGE NUMBER OF RESPONSES PER DAY: All elimination responses | | Incontinent eliminations | | Eliminations in the toilet | |
|---|---|---|---|---|---|---|---|---|---|
| Pair | Code | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. |
| 1 | 53 | 13 | 30 | 8·8 | 8·7 | 2·2 | 0·1 | 6·6 | 8·6 |
| 2 | 40 | 29 | 30 | 11·0 | 9·3 | 3·7 | 0·6 | 7·3 | 8·7 |
| 3 | 49 | 29 | 30 | 9·6 | 9·7 | 2·7 | 0·9 | 6·9 | 8·8 |
| 4 | 01 | 24 | 30 | 7·4 | 10·2 | 4·5 | 1·3 | 2·9 | 8·9 |
| 5 | 05 | 30 | 30 | 8·5 | 10·9 | 5·2 | 2·2 | 3·3 | 8·7 |
| 6 | 26 | 30 | 30 | 5·0 | 10·0 | 4·9 | 1·2 | 0·1 | 8·8 |
| 7 | 22 | 30 | 30 | 4·7 | 9·7 | 4·5 | 0·7 | 0·2 | 9·0 |
| 8 | 19 | 27 | 30 | 4·9 | 9·8 | 4·8 | 1·4 | 0·2 | 8·3 |
| 9 | 18 | 30 | 30 | 4·9 | 10·0 | 4·6 | 0·8 | 0·3 | 9·3 |
| 10 | 28 | 30 | 30 | 5·1 | 10·3 | 4·9 | 0·9 | 0·1 | 9·4 |
| 11 | 04 | 30 | 30 | 5·0 | 9·7 | 5·0 | 1·7 | 0·0 | 8·0 |
| 12 | 10 | 30 | 30 | 5·0 | 9·8 | 4·8 | 2·5 | 0·1 | 7·3 |
| 13 | 48 | 30 | 30 | 5·4 | 10·0 | 5·2 | 2·8 | 0·2 | 7·1 |
| 14 | 45 | 30 | 30 | 4·7 | 9·9 | 4·6 | 2·6 | 0·1 | 7·2 |
| 15 | 36 | 30 | 30 | 4·9 | 5·2 | 4·7 | 5·2 | 0·2 | 0·0 |
| 16 | 44 | 30 | 30 | 5·0 | 5·3 | 4·9 | 4·9 | 0·1 | 0·4 |
| 17 | 27 | 30 | 30 | 5·3 | 5·6 | 5·2 | 5·5 | 0·2 | 0·1 |
| 18 | 02 | 30 | 30 | 4·9 | 5·9 | 4·9 | 5·8 | 0·0 | 0·1 |

in the total number of elimination responses of the whole group at the post-experimental phase (which is shown in Tables 28 and 29). This increase is brought about mainly by the increase in the total number of elimination responses by patients of pairs 6 - 14 inclusive. This is due to the fact that the recording of elimination response rates of these patients in the pre-experimental phase yielded incomplete results. Results were obtained of those eliminations observed while these patients were maintained in nappies (and not of the total number of elimination responses). The recordings made in the post-experimental phase were not confounded in this way because, by then these patients were no longer maintained in nappies. This explanation gains credibility from the data on patients of pairs 1 - 5 inclusive and 15 - 18 inclusive. The first sub-group were not maintained in nappies in either phase and there is no substantial increase in overall elimination response rates in the post-experimental phase. There is an increase in respect of 2 patients only (Ps. 01 and 05), this being an increase in the average number of elimination responses per day (of 2.8 for P 01; and of 2.4 for P 05.). In the other 3 cases there is, in fact, a decrease at the post-experimental phase of between 0.1 and 1.7 responses per day. The second sub-group identified (pairs 15 - 18) were maintained in nappies in the pre-experimental phase and, due to failure to reduce the frequency of incontinent eliminations, also in the post-experimental phase. The average number of elimination responses per day remains limited to an increase of 1.0 or less. In pairs 6 - 14 inclusive, the increase noted ranges from 4.6 to 5.2 elimination responses per day in the post-experimental phase.

In view of the difficulties which arise from the incomplete recording in both phases, affecting the majority of patients (13) in the pre-experimental phase and a minority (4) in the post-experimental phase,

Table 35: Patients in the experimental group (E I) by degree of incontinence at the pre- and post - experimental phases.

$$\text{Degree of incontinence} = \frac{\text{No. of incontinent Eliminations}}{\text{No. of all eliminations}} \times 100$$

| Patient Pair | Patient Code | Degree of Incontinence (%) Pre-Experimental | Post-Experimental | Difference (% |
|---|---|---|---|---|
| 1 | 53 | 25 | 02 | -23 |
| 2 | 40 | 33 | 07 | -26 |
| 3 | 49 | 28 | 10 | -18 |
| 4 | 01 | 60 | 13 | -47 |
| 5 | 05 | 61 | 21 | -40 |
| 6 | 26 | 98 | 12 | -86 |
| 7 | 22 | 96 | 08 | -88 |
| 8 | 19 | 97 | 15 | -82 |
| 9 | 18 | 95 | 08 | -87 |
| 10 | 28 | 97 | 08 | -89 |
| 11 | 04 | 99 | 18 | -81 |
| 12 | 10 | 97 | 25 | -72 |
| 13 | 48 | 96 | 28 | -68 |
| 14 | 45 | 98 | 27 | -71 |
| 15 | 36 | 97 | 100 | +03 |
| 16 | 44 | 98 | 93 | -05 |
| 17 | 27 | 97 | 99 | +02 |
| 18 | 02 | 100 | 98 | -02 |

Table 36: Distribution of patients in the experimental group (E I) by percentage degree of incontinence at the pre- and post-experimental phases (30 days)

| Percentile Degree of Incontinence | Number of Patients | |
|---|---|---|
| | Pre-Exp. | Post-Exp. |
| 90 - 100% | 13 | 4 |
| 80 - 89% | 0 | 0 |
| 70 - 79% | 0 | 0 |
| 60 - 69% | 2 | 0 |
| 50 - 59% | 0 | 0 |
| 40 - 49% | 0 | 0 |
| 30 - 39% | 1 | 0 |
| 20 - 29% | 2 | 5 |
| 10 - 19% | 0 | 4 |
| 0 - 09% | 0 | 5 |
| | n = 18 | n = 18 |

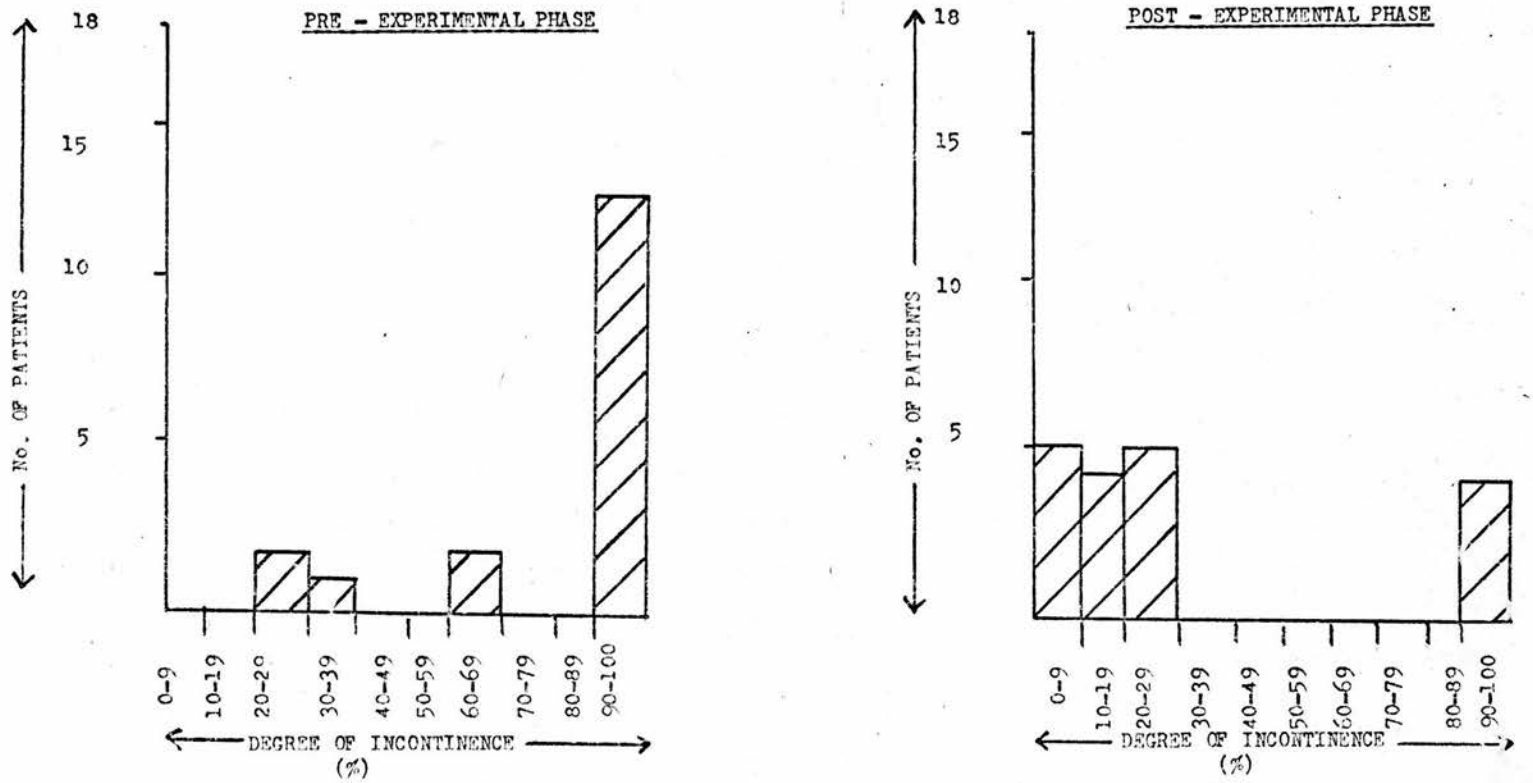


Figure 21 : Histograms showing distribution of patients in the experimental group (EI) by percentile degree of incontinence at the pre- and post- experimental phases.

an alternative measurement is introduced to allow direct comparison of incontinent eliminations in the pre-and post-experimental phases. This is referred to as the 'degree of incontinence' and is calculated as the percentage of all elimination responses which are incontinent. Table 35 shows the distribution of patients in the pre-experimental and post-experimental phases according to their degree of incontinence. The divisions noted previously within the group at the pre- and post-experimental phases can be more clearly seen on this measure. At the pre-experimental phase, patients of pairs 1 - 5 inclusive have a lesser degree of incontinence (25 - 61%) than the remainder of the group. Patients of pairs 6 - 18 show a high degree of incontinence (95 - 100%). At the post-experimental phase, patients of pairs 15 - 18 inclusive show little or no change and remain with a high degree of incontinence (93 - 100%). Patients of pairs 1 - 14 inclusive, in contrast, show a low degree of incontinence (02 - 28%): and, in this sub-group, the degree of incontinence has been reduced in all cases. The amount of reduction ranges from 89% (P 10) to 18% (P49).

Table 36 and Figure 21 (from Table 36) show the change in the distribution of the experimental group according to the degree of incontinence. Table 36 shows the frequency distribution by percentile degrees of incontinence and Figure 21 presents these data as a histogram. These clearly show the changes by the post-experimental phase. While, in the pre-experimental phase the majority of patients in the group lie in the 50 - 100% degree of incontinence range, in the post-experimental phase the situation is reversed with the majority in the 0 - 50% range.

b. Change in toilet status -

In the pre-experimental phase, 5 patients (Ps 53, 40, 49, 01 and 05) are contained in toilet status Group 2 (i.e. "being potty trained")

Table 37: Prevalence of total incontinence in the experimental group (E I) before and after Experiment I.

| | Number of Patients / % of group | | | |
|---|---|---|---|---|
| | Totally Incontinent | | Not Totally Incontinent | |
| Pre-Experimental Phase | 13 | 72.22 | 5 | 27.78 |
| Post-Experimental Phase | 4 | 22.22 | 14 | 77.78 |

Table 38: Use of nappies in the experimental group (E I) before and after Experiment I

| | Number of patients / % of group maintained in nappies | |
|---|---|---|
| Pre-Experimental Phase | 13 | 72.22 |
| Post-Experimental Phase | 4 | 22.22 |

and thus considered to have some degree of continence. The remaining 13 patients were contained in toilet status Group 3 (i.e. "incontinent") and considered to be totally incontinent. The precise response frequencies confirm this grouping system as accurate. A similar system can be used to express the response frequencies of the post-experimental phase in such general terms.

At the post-experimental phase 4 patients (Ps. 36, 44, 27 and 02), who were totally incontinent at the pre-experimental phase, remain incontinent. The remaining patients are not totally incontinent. Table 37 summarises these results. In the pre-experimental phase 72.22% of the experimental group are totally incontinent and 27.78% have some degree of continence. The situation is reversed at the post-experimental phase with 22.22% of the group being totally incontinent and 77.78% have some degree of continence. This represents a reduction of 50% in the prevalence of total incontinence in the experimental group by the post-experimental phase.

c. Use of nappies -

A further general measure of the reduction in the prevalence of total incontinence in the group is reflected in a similar reduction of 50.00% in the practice of maintaining patients in nappies. Table 38 shows this result.

d. Acquisition of target behaviours related to 'eliminating' (i.e. targets 1,2,3,4) -

Data presented to this point refer to elimination response rates over a 24-hour day period as recorded in the pre- and post-experimental phases. The experimental phase involved a daily period from 7.00 a.m. - 10.00 p.m. Evaluation of experimental results therefore is confined to this period. Indication of the degree of incontinence /continence

is obtained by referring to the model of shaping toilet behaviour. Targets 1 - 4 inclusive measure patients' degree of incontinence/ continence in accordance with the method of calculation previously used. The degree of incontinence equivalent to the appropriate targets is noted below:-

| Target No. | Target | Equivalent Degree of incontinence (percentiles) |
|---|---|---|
| 1 | Patient uses toilet when placed on it, but is incontinent at all other times | 51 - 90% |
| 2. | Patient has established some regularity and uses toilet more frequently than is incontinent | 21 - 50% |
| 3. | Patient eliminates in the toilet regularly and has only infrequent episodes of incontinence | 11 - 20% |
| 4. | Patient eliminates only in the toilet and is otherwise continent | 0 - 10% |

At the pre-experimental phase, 5 patients had some previously established target behaviours related to 'eliminating'. Of these 5 patients, 3 patients (Ps. 53, 40 and 49) had reached target 2, and the other 2 patients (Ps. 01 and 05) had reached target 1 only. The remaining 13 patients had not established any targets related to 'eliminating' and were totally incontinent (i.e. 91 - 100% degree of incontinence).

Between the 80th and 90th day of the experimental phase, target behaviours were evaluated for the final time. At this point, 4 patients (Ps. 36, 44, 27 and 02) had not established any of the targets related to 'eliminating'. The remaining 14 patients had established at least some of these targets.

Of these 14 patients, 7 patients (Ps. 53, 40, 49, 26, 22, 18 and 28) had reached the final target (i.e. target 4); 5 patients (Ps. 01, 05, 19, 04 and 10) reached the second level of intermediate target (i.e. target 3); and the remaining 2 patients (Ps. 48 and 45) reached the first level of intermediate target (i.e. target 2). Figure 22 shows the acquisition of targets related to 'eliminating' in the experimental group by the final 10 days of the experimental phase.

Table 39 shows, from this, the numbers of targets established within the group before and at the end of the Experiment I. At the pre-experimental phase, 8 targets were established by the group (11.11% of possible targets) and 47 targets at the end of Experiment I (65.28% of possible targets). This represents an increase of 51.17% in the number of established targets related to 'eliminating' by the end of Experiment I for the experimental group as a whole: (total of 39 targets acquired). Table 40 shows that the mean number of targets acquired is 2.16 (with a standard deviation of 1.14).

Comparison of Tables 35 and Figure 22 shows some discrepancy between the post-experimental degree of incontinence of some patients in the experimental group and their evaluation on targets 1 - 4 at the end of the experiment. The discrepancy arises in relation to 3 patients (Ps. 05, 06, 10). In each case, the patient is shown to have established a target one nearer to the final target behaviour at the end of the experimental phase than the degree of incontinence at the post-experimental phase would indicate. Examination of data obtained from post-experimental response recording shows the discrepancy to arise on account of night-time incontinence only.

Six patients (Ps 53, 40, 49, 22, 18 and 28) show a degree of incontinence of 10%, or less than 10%, in the post-experimental phase. These patients can be considered to be continent by night as well as

Table 39: Number of target behaviours related to 'eliminating' established before and by the end of Experiment I in the experimental group (E I)

| Established Targets | Number of Patients | | Number of Targets | |
|---|---|---|---|---|
| | Pre-Exp. | End of Exp I | Pre-Exp. | End of Exp. I |
| 1 - 4 (incl) | 0 | 7 | 0 | 28 |
| 1 - 3 (incl) | 0 | 5 | 0 | 15 |
| 1 and 2 | 3 | 2 | 6 | 4 |
| 1 only | 2 | 0 | 2 | 0 |
| none | 13 | 4 | 0 | 0 |
| | n = 18 | n = 18 | 8 (= 11.11%) | 47 (= 65.28%) |

Mean no. of targets established at end = 2.61
Standard deviation = 2.12.

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Table 40: Distribution of patients in the experimental group (E I) by the number of 'eliminating' targets acquired during Experiment I .

| No. of targets acquired. | No. of patients | fx |
|---|---|---|
| 0 | 4 | 0 |
| 1 | 0 | 0 |
| 2 | 7 | 14 |
| 3 | 3 | 9 |
| 4 | 4 | 16 |
| | n = 18 | Efx = 39 |

Mean no of targets acquired = 2.16
Standard deviation = 1.14
Variance = 1.29

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by day on this basis. Of the remaining 8 patients in the sub-group which shows a reduction of incontinence, this reduction pertains both to day and night-time incontinence.

(ii) Improvement in toilet behaviour :

From the results presented of the measures indicating a reduction in incontinence, it is evident that there is concurrent increase in eliminations in the toilet. The absolute number of eliminations in the toilet is shown to have increased as is the average response frequency per day of the group and the average response frequency per day of the majority of patients within the group. It is clear that, with the reduction in incontinence, there is improvement in toilet behaviour in terms of increased continence. This is previously noted in relation to targets 1 - 4 on the model of shaping toilet behaviour. The remainder of this section presents results of improvements in toilet behaviour on the other three areas of the model - 'sitting' (targets 5 - 8), 'dressing' (targets 9 - 12) and 'going' (targets 13 - 16).

a toilet behaviour - 'sitting';

Figure 23 shows the acquisition of target behaviours related to 'sitting' (targets 5 - 8) by the experimental group (E I) at the end of Experiment I.

At the pre-experimental phase 4 patients (Ps. 53, 40, 01, 05) had some previously established target behaviours related to 'sitting'. 1 patient (P 53) had reached the first-level intermediate target (target 6) and the other 3 patients the base target only (target 5.)

At the end of Experiment I, all patients had at least one established 'sitting' target. 8 patients (Ps. 53, 40, 49, 01, 26, 18, 28, and 04) had reached the final target behaviour (target 8); 6 patients (Ps. 05, 22, 19, 10, 48, 45) the second-level intermediate

target (target 7); and the remaining 4 patients (Ps. 36, 44, 27, and 02) reached the base target (target 5) only.

Table 41 shows the number of targets related to 'sitting' established before and by the end of Experiment I in the experimental group. 5 targets were established at the pre-experimental assessment (i.e. 6.94% of the possible targets) and 54 targets (i.e. 75% of possible targets) at the end of the Experiment. This represents a 68.06% improvement.

Table 42 shows the distribution of patients' in the experimental group by the number of 'sitting' targets acquired during Experiment I. The mean number of targets acquired is 2.72, with a standard deviation of 1.10.

b. toilet behaviour - 'dressing':

Figure 24 shows the acquisition of target behaviours related to 'dressing' (targets 9 - 12) by the experimental group at the end of Experiment I.

At the pre-experimental phase 5 patients (Ps 53, 40, 49, 01 and 05) had already one established target related to dressing, in each case this being the base target (target 9). The remaining 13 patients had no previously established targets.

At the end of the experimental phase, all patients had at least one established 'dressing' target. Only 1 patient (P 49) reached the final target (target 12); 4 patients (Ps 53, 40, 01 and 04) reached the second level intermediate target (target 11); 5 patients (Ps 05, 26, 22, 19 and 28) reached the first level intermediate target (target 10); and the remaining 8 patients (Ps 18, 10, 48, 45, 36, 44, 27, 02) reached the base target (target 9).

Table 43 shows the number of targets related to 'dressing' established before and by the end of Experiment I in the experimental

group. A total of 5 targets were established at the pre-experimental phase (6.94% of possible score) and 34 targets at the end of the experimental phase (47.22% of possible score). This represents a 40.28% improvement.

Table 44 shows the distribution of patients in the experimental group by the number of 'dressing' targets acquired during Experiment I. The mean number of targets acquired is 1.61 with a standard deviation of 0.68.

c. toilet behaviour - 'going' :

Figure 25 shows the acquisition of target behaviours related to 'going' (targets 13 - 16) by the experimental group at the end of Experiment I.

At the pre-experimental phase 5 patients (Ps 53, 40, 49, 01 and 05) had already established one 'going' target, the base target (target 13) in each case. The remaining 13 patients had no previously established targets.

At the end of the experimental phase, all patients except one (P 05) had acquired one or more 'going' targets. One patient only (P 53) reached the second-level intermediate target (target 15), with no patient reaching the final target (target 16); 6 patients (Ps. 40. 49, 01, 22, 28 and 04) had reached the first-level intermediate target; and the remaining 11 patients (Ps. 05, 26, 19, 18, 10, 48, 45, 36, 44, 27 and 02) the base target (target 13) only.

Table 45 shows the number of targets related to 'going' established before and by the end of Experiment I in the experimental group. A total of 5 targets were established at the pre-experimental phase (6.94% of possible score) and a total of 26 targets at the end of the experimental phase (36.11% of possible score). This represents a 21.17% improvement.

Table 46 shows the distribution of patients in the experimental group by the number of 'going' targets acquired during Experiment I. The mean no. of targets acquired is 1.17 with a standard deviation of 0.46.

### d. toilet behaviour - elimination response and pre-elimination toilet skills

Having considered the elimination response (in previous section) and the pre-elimination toilet skills, i.e. the four areas of toilet behaviour within the model, separately to date, similar analysis can be presented of toilet behaviour overall and comparisons made between areas within it.

Figure 26 shows the acquisition of target behaviours on the complete model, i.e. 16 targets, for patients in the experimental group (E I) at the end of Experiment I. Table 47 shows the same data in terms of the number of target behaviours established before and by the end of Experiment I. It is seen that no patient in fact reached the complete final target behaviour. Ps. 53 and 49 come nearest to this with totals of 14 out of 16 targets established by the end of the experimental phase. Table 47 (i) contains a distribution of patients by the percentage of the final target behaviour established by the end of Experiment I. The mean percentage of the final target behaviour established is 55.9%, with the median slightly higher at 62.5%. 11 of the 18 patients (i.e. 61.11% of the group) have established more than 50% of the final target behaviour. 4 of the 18 patients (i.e. 22.22% of the group) have established less than 25.00% of the final target behaviour: (see histogram, Figure 27).

Table 48 shows the numbers of target behaviours acquired and established by the experimental group (E I) on each area of the model ('eliminating', 'sitting', 'dressing', 'going') and the total model (i.e. targets 1 - 16). This allows comparison to be made

of areas with one another. The greatest number of targets established before the experiment is in the 'eliminating' area (targets 1 - 4) in which a total of 8 (mean of 0.5 per patient) was established. In each of the other three areas, a total of 5 was previously established (mean of 0.28 per patient). The area in which the greatest number of targets was acquired during the experiment is that of 'sitting' (targets 5 - 8), a total of 49 targets being acquired. This area shows also the greatest number of targets (a total of 54) established by the end of the experiment, representing the greatest percentage increase over baseline (68.06%). The second greatest percentage increase over baseline arises in the 'eliminating' area (targets 1 - 4) with an increase of 68.06%. A mean of 2.17 targets were acquired per patient in this area. The standard deviation is 1.14, the highest of the areas overall. While the same number of targets were previously established in the 'dressing' and 'going' areas, lower number of targets were acquired during the experiment and established by the end of the experiment. In the 'dressing' area, the total acquired was 29 (mean of 1.61 per patient) and the total established was 34 (mean of 1.89 per patient). This represents a 40.28% increase over baseline. In the 'going' area, the total acquired was 21 (mean of 1.17 per patient), the total established was 26 (mean of 1.44 per patient), and the percentage increase over baseline was 29.17%. These data show that the area in which the group as a whole fared best is that of 'sitting', both in terms of the number of targets acquired and the number established at the end of the experiment. The 'eliminating' area follows this, and next is the 'dressing' area. The poorest acquisition and improvement is in the 'going' area.

From Figure 26, and subsequent tables, it is clear that 4 patients (Ps 36, 44, 27, 02: pairs 15 - 18 inclusive) show minimal improvement

Table 41: Number of target behaviours related to 'sitting' established before and by the end of Experiment I in the experimental group. (E I)

| Established targets | Number of Patients Pre-Exp. | Number of Patients End of Exp. I | Number of targets Pre-Exp. | Number of targets End of Exp. I |
|---|---|---|---|---|
| 5 - 8 (incl) | 0 | 8 | 0 | 32 |
| 5 - 7 (incl) | 0 | 6 | 0 | 18 |
| 5 and 6 only | 1 | 0 | 2 | 0 |
| 5 only | 3 | 4 | 3 | 4 |
| none | 14 | 0 | 0 | 0 |
| | n = 18 | n = 18 | 5 | 54 |

Mean No. established at end of Exp. I = 3.00

Standard deviation = 1.15

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Table 42: Distribution of patients in the experimental group (E I) by number of 'sitting' targets acquired during Experiment I

| No of targets acquired | No. of patients f | fx |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 4 | 4 |
| 2 | 2 | 4 |
| 3 | 7 | 21 |
| 4 | 5 | 20 |
| | n = 18 | $\Sigma fx = 49$ |

Mean No. of 'sitting' targets acquired = 2.72

Standard deviation = 1.10

Variance = 1.21

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Table 43: Number of target behaviours related to 'dressing' established before and by the end of Experiment I in the experimental group (E I).

| Established Targets | Number of Patients Pre-Exp. | Number of Patients End of Exp. I | Number of Targets Pre-Exp. | Number of Targets End of Exp I |
|---|---|---|---|---|
| 9 - 12 (incl) | 0 | 1 | 0 | 4 |
| 9 - 11 (incl) | 0 | 4 | 0 | 12 |
| 9 and 10 only | 0 | 5 | 0 | 10 |
| 9 only | 5 | 8 | 5 | 8 |
| none | 13 | 0 | 0 | 0 |
| | n = 18 | n = 18 | 5 | 34 |

Mean no. targets established at end = 1.89
Standard deviation = 0.93

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Table 44: Distribution of patients in the experimental group (E I) by number of 'dressing' targets acquired during Experiment I

| No. of targets acquired | No. of patients f | fx |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 9 | 9 |
| 2 | 7 | 14 |
| 3 | 2 | 6 |
| 4 | 0 | 0 |
| | n = 18 | Efx = 29 |

Mean no of 'dressing' targets acquired = 1.61
Standard deviation = 0.68
Variance = 0.46

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Table 45: Number of target behaviours related to 'going' established before and by the end of Experiment I in the experimental group. (E I)

| Established Targets | Number of patients | | Number of targets | |
|---|---|---|---|---|
| | Pre-Exp. | End of Exp. I | Pre-Exp. | End of Exp. I |
| 13 - 16 (incl) | 0 | 0 | 0 | 0 |
| 13 - 15 (incl) | 0 | 1 | 0 | 3 |
| 13 and 14 only | 0 | 6 | 0 | 12 |
| 13 only | 5 | 11 | 5 | 11 |
| none | 13 | 0 | 0 | 0 |
| | n = 18 | n = 18 | 5 | 26 |

Mean no. of targets established at end = 1.44
Standard deviation = 0.61

Table 46: Distribution of patients in the experimental group (E I) by number of 'going' targets acquired during Experiment I

| No. of targets acquired | No. of patients f | fx |
|---|---|---|
| 0 | 1 | 0 |
| 1 | 13 | 13 |
| 2 | 4 | 8 |
| 3 | 0 | 0 |
| 4 | 0 | 0 |
| | n = 18 | Efx = 21 |

Mean no. of 'going' targets acquired = 1.17
Standard deviation = 0.46
Variance = 0.21

Table 47 : Total number of target behaviours established before and by the end of Experiment I by patients in the experimental group (EI).

| PAIR | CODE | ELIMINATING | | | SITTING | | | DRESSING | | | GOING | | | ALL TARGETS | | | % of Final Target Behaviour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 1 | 53 | 2 | 2 | 4 | 2 | 2 | 4 | 1 | 2 | 3 | 1 | 2 | 3 | 6 | 8 | 14 | 77·5 |
| 2 | 40 | 2 | 2 | 4 | 1 | 3 | 4 | 1 | 2 | 3 | 1 | 1 | 2 | 5 | 8 | 13 | 81·3 |
| 3 | 49 | 2 | 2 | 4 | 0 | 4 | 4 | 1 | 3 | 4 | 1 | 1 | 2 | 4 | 10 | 14 | 87·5 |
| 4 | 01 | 1 | 2 | 3 | 1 | 3 | 4 | 1 | 2 | 3 | 1 | 1 | 2 | 4 | 8 | 12 | 75·0 |
| 5 | 05 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 1 | 2 | 1 | 0 | 1 | 4 | 5 | 9 | 56·3 |
| 6 | 26 | 0 | 4 | 4 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 11 | 11 | 68·8 |
| 7 | 22 | 0 | 4 | 4 | 0 | 3 | 3 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 11 | 11 | 68·8 |
| 8 | 19 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 9 | 9 | 56·3 |
| 9 | 18 | 0 | 4 | 4 | 0 | 4 | 4 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 10 | 10 | 62·5 |
| 10 | 28 | 0 | 4 | 4 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 12 | 12 | 75·0 |
| 11 | 04 | 0 | 3 | 3 | 0 | 4 | 4 | 0 | 3 | 3 | 0 | 2 | 2 | 0 | 12 | 12 | 75·0 |
| 12 | 10 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 8 | 50·0 |
| 13 | 48 | 0 | 2 | 2 | 0 | 3 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 7 | 7 | 43·8 |
| 14 | 45 | 0 | 2 | 2 | 0 | 3 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 7 | 7 | 43·8 |
| 15 | 36 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 3 | 3 | 18·8 |
| 16 | 44 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 3 | 3 | 18·8 |
| 17 | 27 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 3 | 3 | 18·8 |
| 18 | 02 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 3 | 3 | 18·8 |
| Totals: | | 8 | 39 | 47 | 5 | 49 | 54 | 5 | 29 | 34 | 5 | 21 | 26 | 23 | 138 | 161 | |

A = No. established before programme

B = No. acquired during programme

C = No. established at end of programme

Table 47: Distribution of patients in the experimental group (E I) by percentage of the final target behaviour (16 targets) at the end of Experiment I.

| No. of Targets behaviours | % of Final target behaviour | Number of of patients |
|---|---|---|
| 16 | 100 | 0 |
| 15 | 93.8 | 0 |
| 14 | 87.5 | 2 |
| 13 | 81.3 | 1 |
| 12 | 75.0 | 3 |
| 11 | 68.8 | 2 |
| 10 | 62.5 | 1 |
| 9 | 56.3 | 2 |
| 8 | 50.0 | 1 |
| 7 | 43.8 | 2 |
| 6 | 37.5 | 0 |
| 5 | 31.3 | 0 |
| 4 | 25.0 | 0 |
| 3 | 18.8 | 4 |
| 2 | 12.5 | 0 |
| 1 | 6.3 | 0 |
| | | n = 18 |

Mean No. of target behaviours established = 8.94
Median " " " " = 10

Mean % of final target behaviour established = 55.9%
Median % " " " " = 62.5%

Table 48: Target behaviours established before, acquired during and established at the end of Experiment I in the Experimental Group (E I) on the model of shaping toilet behaviour.

| | 'BEFORE' | | 'ACQUIRED DURING' | | | 'ESTABLISHED AT END' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. estab. before | Mean no. estab. before | No. acquired during exp. | Mean no. acquired during experiment | Standard Deviation | No. estab. at and of exp. | Mean no. estab. at end of exp. | Standard Deviation | % of final target estab. | % increase over baseline. |
| 1-4 (eliminating') | 8 | 0.5 | 39 | 2.17 | 1.14 | 47 | 2.61 | 2.12 | 65.28 | 51.17 |
| 5-8 ('sitting') | 5 | 0.28 | 49 | 2.72 | 1.10 | 54 | 3.00 | 1.15 | 75.00 | 68.06 |
| 9-12('dressing') | 5 | 0.28 | 29 | 1.61 | 0.68 | 34 | 1.89 | 0.93 | 47.22 | 40.28 |
| 3-16('going') | 5 | 0.28 | 21 | 1.17 | 0.46 | 26 | 1.44 | 0.61 | 36.11 | 29.17 |
| 1-16 (ALL TARGETS) | 23 | 1.28 | 138 | 7.67 | 3.05 | 161 | 8.94 | 3.77 | 55.90 | 47.91 |

Figure 22 : Acquisition of target behaviours related to 'eliminating' (ie targets 1 - 4 incl.) by the experimental group (EI) at the end of Experiment I.

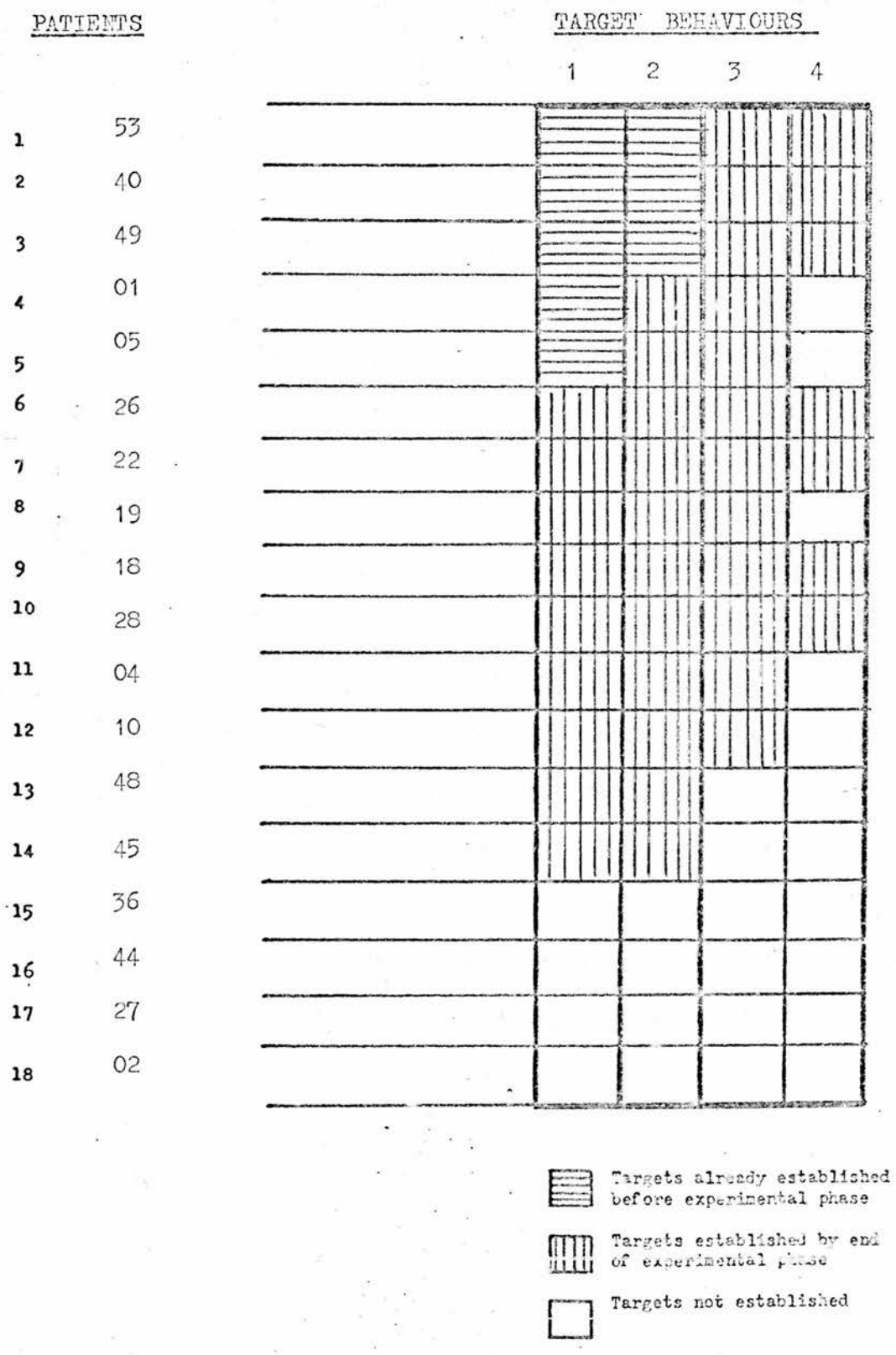


Figure 23 : Acquisition of target behaviours related to 'sitting' (ie targets 5 - 8 incl.) by the experimental group (EI) at the end of Experiment I.

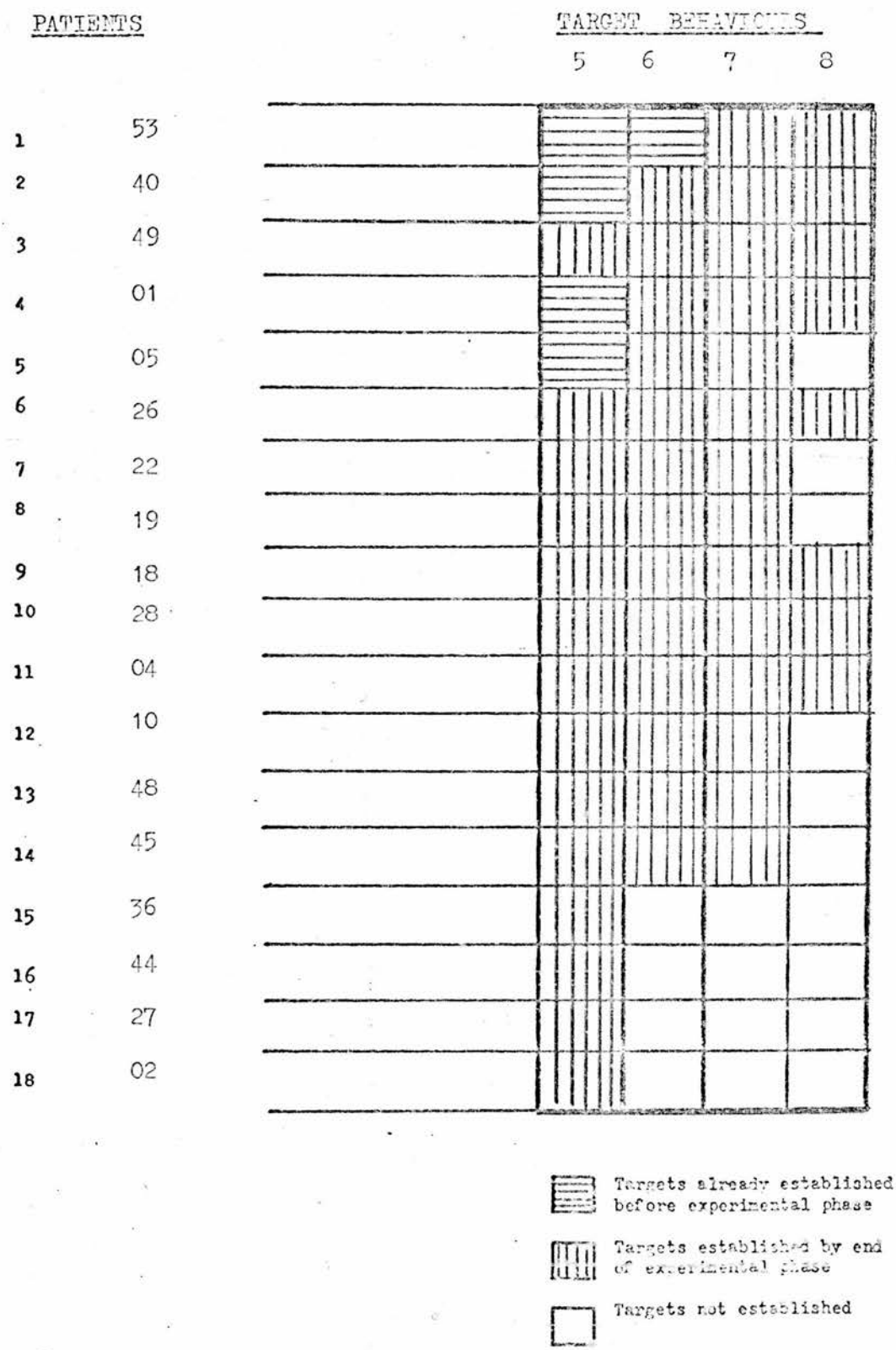


Figure 24 : Acquisition of target behaviours related to 'dressing' (ie targets 9 - 12 incl.) by the experimental group at the end of Experiment I.

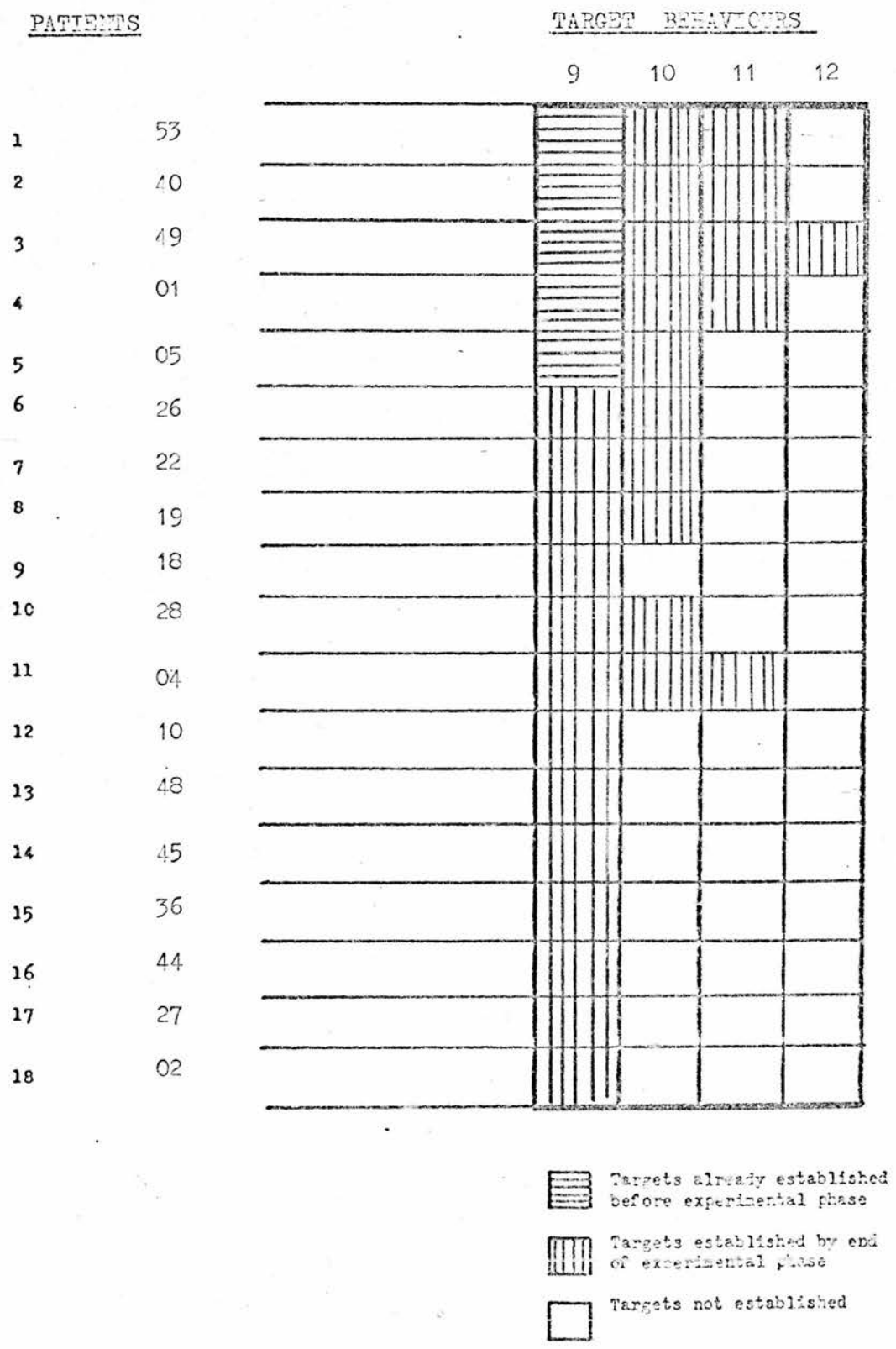


Figure 25 : Acquisition of target behaviours related to 'going' (ie targets 13 - 16 incl.) by the experimental group (EI) at the end of Experiment 1.

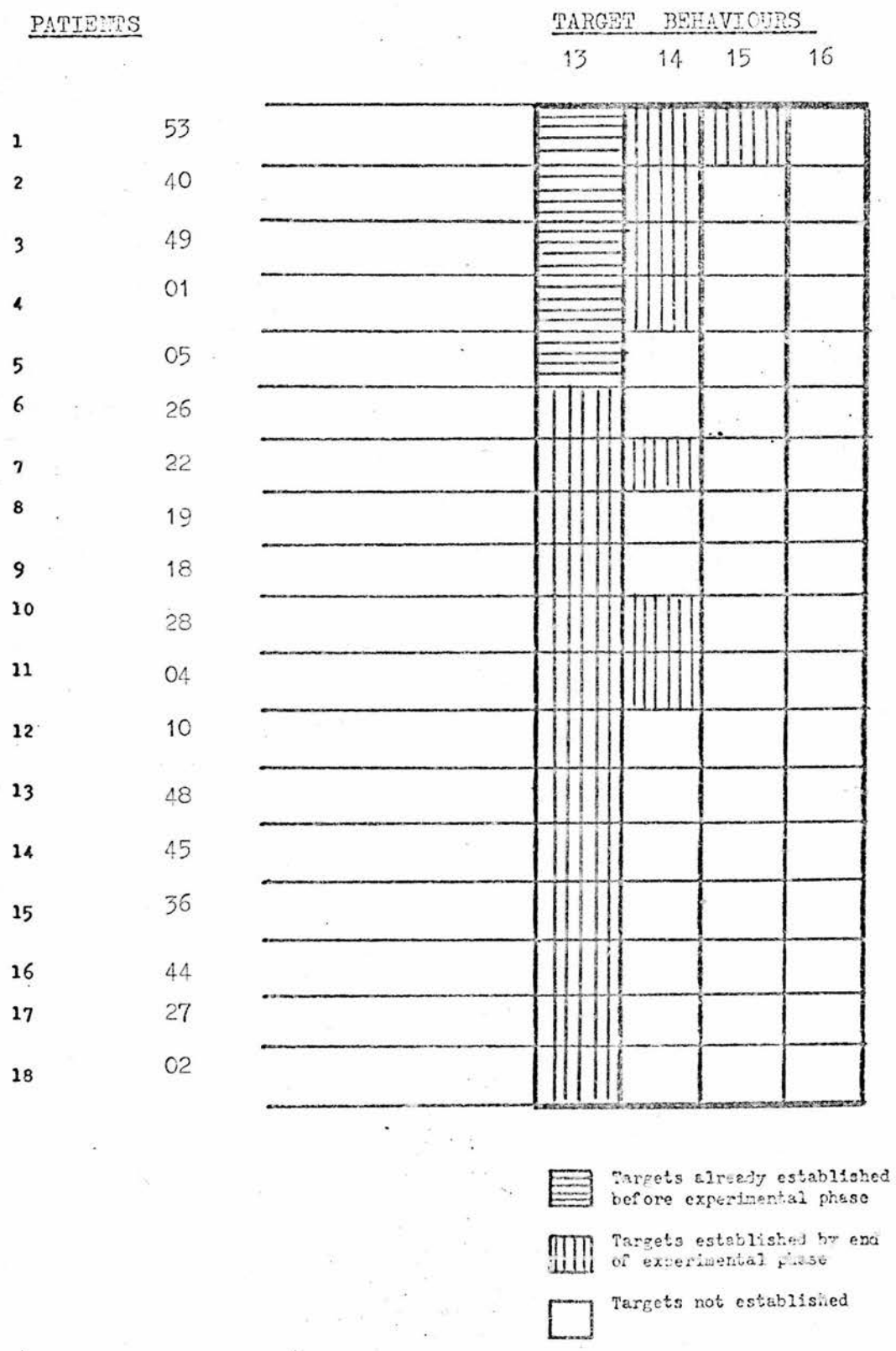
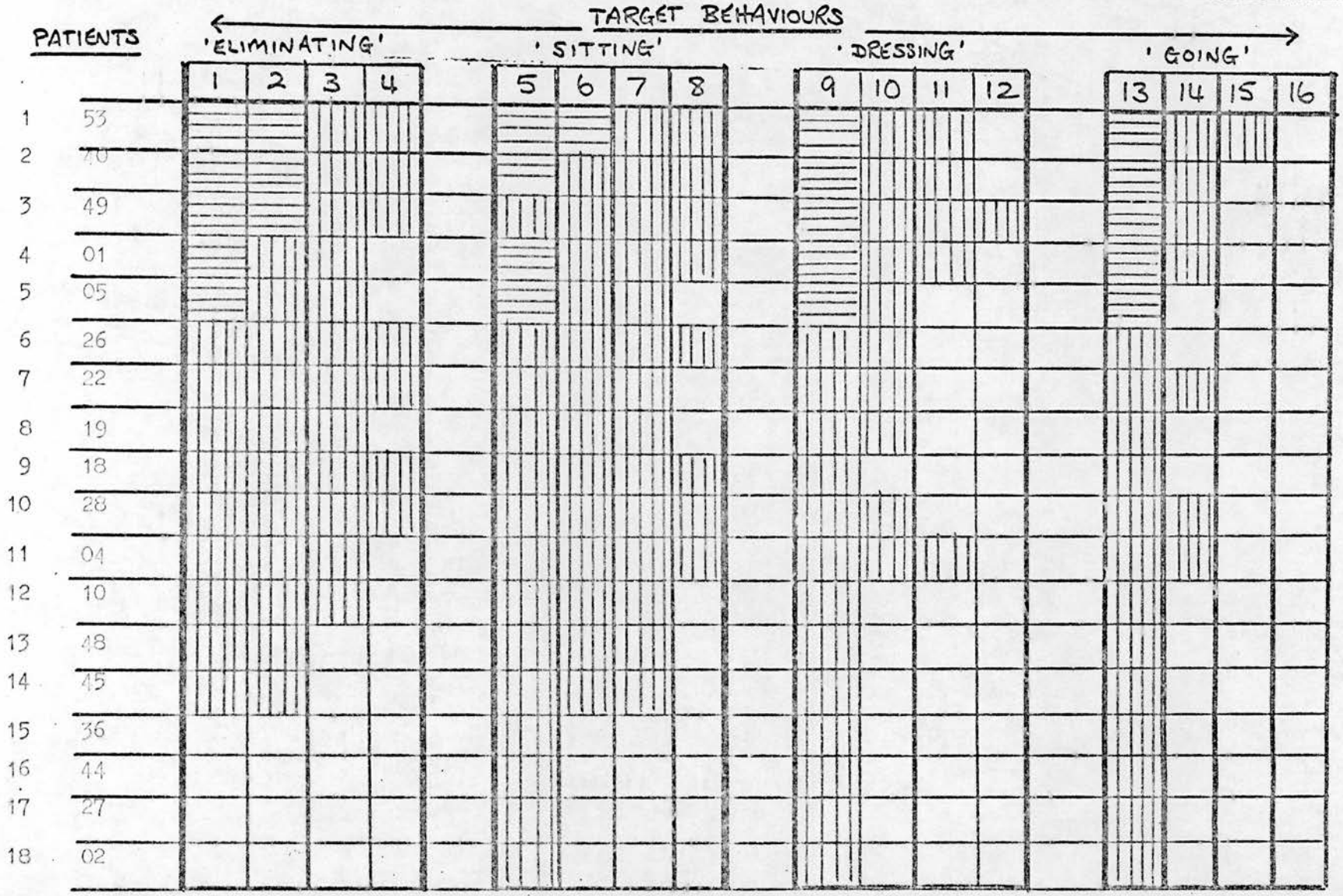


Figure 26 : Acquisition of targets related to toilet behaviour (targets 1-16) by the experimental group (EI) at the end of Experiment I.




Targets established before experimental phase

Targets established by end of experimental phase

Targets not established

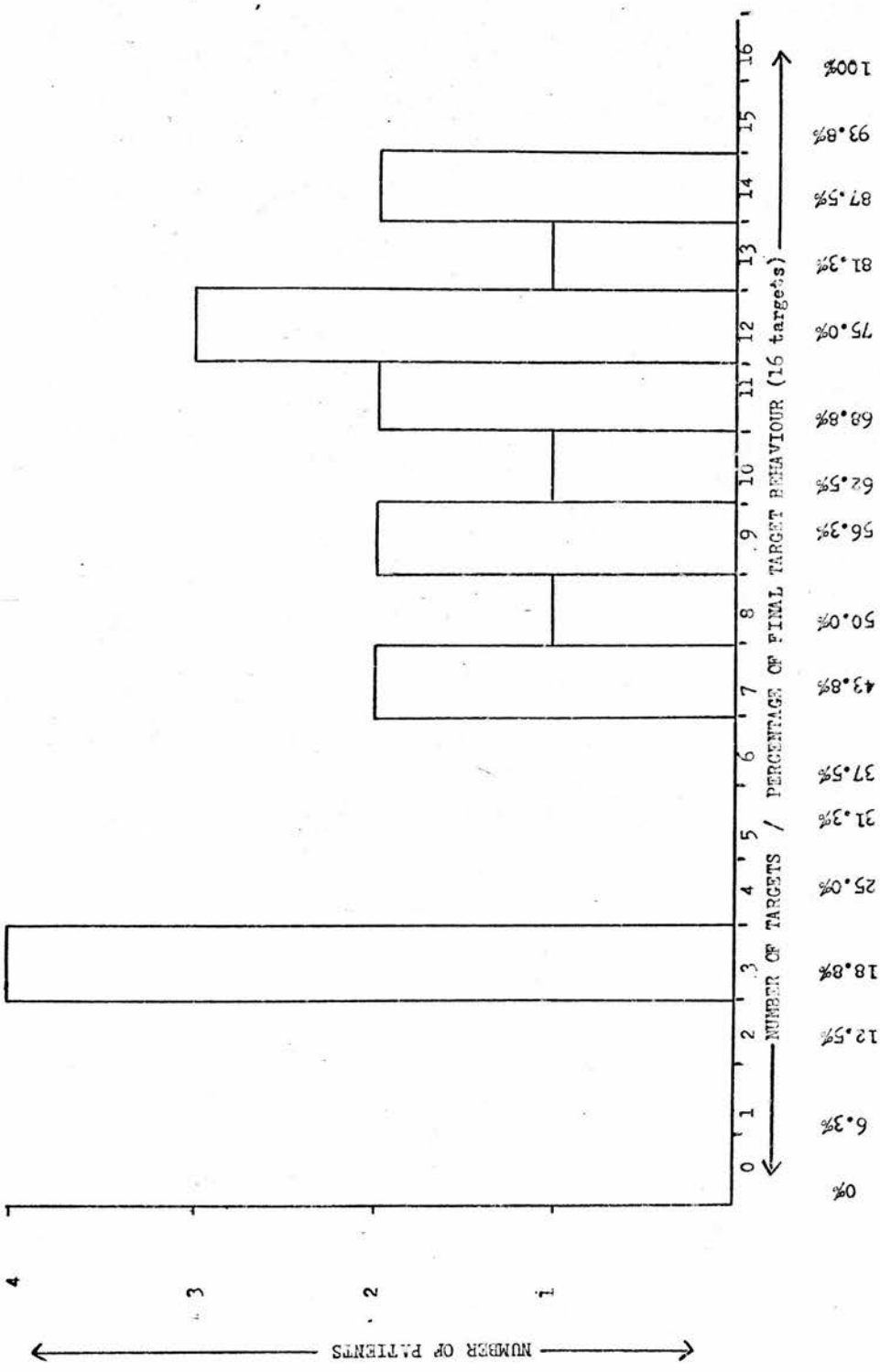



Figure 27 : Histogram of distribution of patients by number of targets / percentage of final target behaviour established (Group EI) in Experiment I.

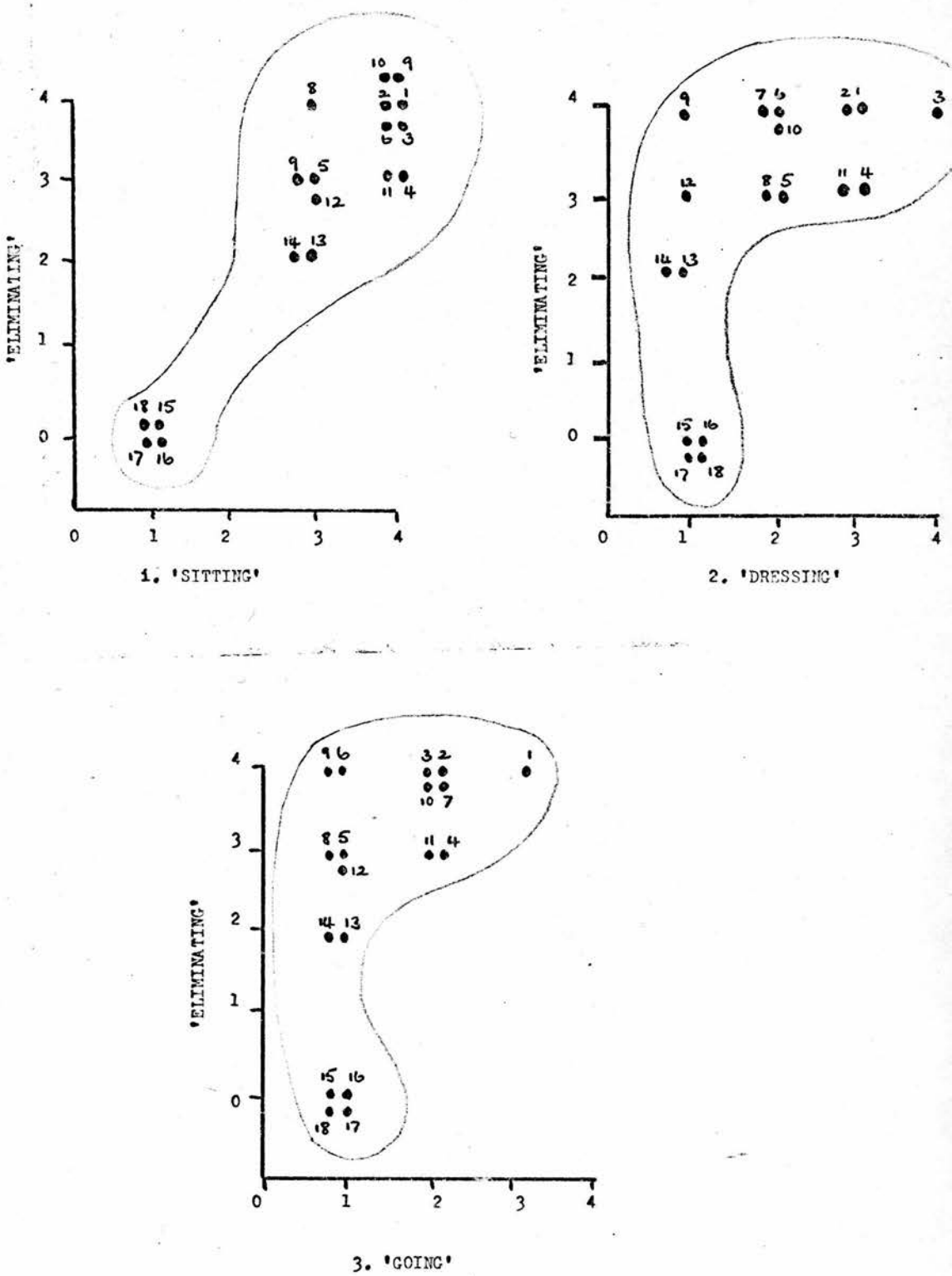



Figure 28 (i) : Scatter diagrams of scores of 18 patients (EI) on 'eliminating' area of model and scores on other 3 areas of model ('sitting', 'dressing', 'going').

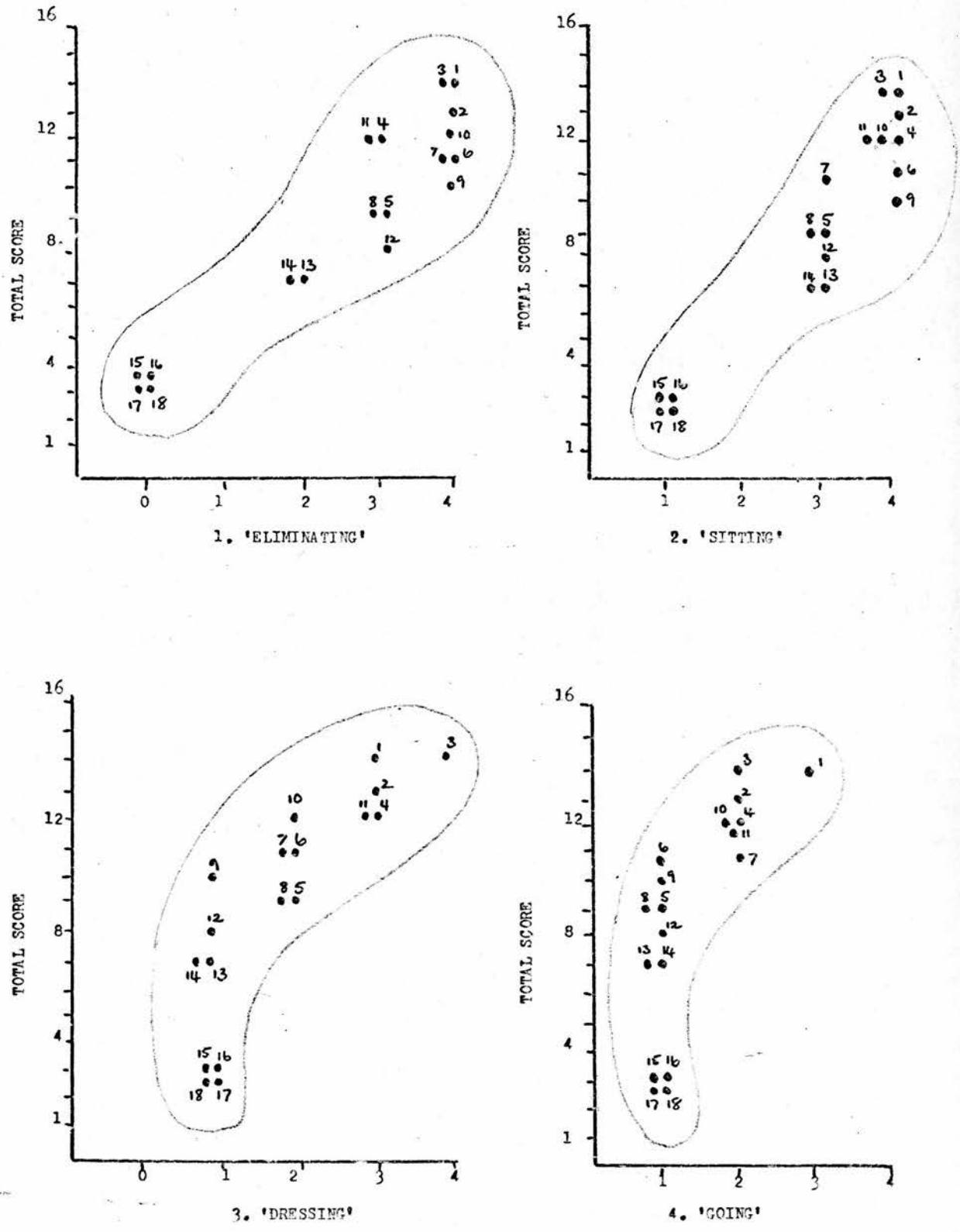



Figure 28 (ii) : Scatter diagrams of total score on the model (16 targets) and score on the four areas of the model. (Group II).

in terms of the acquisition of target behaviours, on the model. These patients acquired none of the targets related to 'eliminating' and only one target each (the base target) in the other three areas of the model. The percentage of the final target behaviour established at the end of the experiment is 18.8%, 25.0% lower than the 2 patients (Ps. 48 and 45) who have the lowest percentage of the final target behaviour of the remaining 14 patients. This suggests that there may be an association between the acquisition of 'eliminating' behaviours (i.e. the elimination response in the toilet) and acquisition of the related pre-elimination toilet behaviours ('sitting', 'dressing', 'going'). Figure 28 (i) provides scatter diagrams of the score on the 'eliminating' area of the model and that on each of the other three areas for each of the patients in the experimental group. These diagrams illustrate the association (or correlation) of the score on 'eliminating' and that on 'sitting', 'dressing' and 'going' respectively (1, 2, 3). The first diagram suggests a high positive correlation between the score on 'eliminating' and that on 'sitting'. The distribution shows a linear function with minimal variability or deviation from the line. The second and third diagrams show curvilinear functions and a higher degree of variability, but a low positive correlation is evident between 'eliminating' and 'dressing', and between 'eliminating' and 'going'. Figure 28 (ii) shows scatter diagrams of the total score on the model and the score on the four areas of the model ('eliminating', 'sitting', 'dressing' and 'going') for the patients in the experimental group. In each diagram, a positive correlation is suggested between the score on the total model and the score of each area of the model. The highest positive correlation is between the total score and the score on the 'sitting' area with a linear function clearly illustrated. A high positive correlation exists between the total score and the score on the 'eliminating' area. This too has a linear distribution.

Low positive correlations, with curvilinear distribution, are shown between the total score and the scores on 'dressing' and 'going'.

These scatter diagrams therefore add support to the suggestion that there is an association between the acquisition of 'eliminating' behaviours and the other toilet behaviours. The strongest association is between 'eliminating' and 'sitting', and the weakest between 'eliminating' and 'going'. There is a high positive correlation between the score obtained in the 'sitting' area and that obtained on the total model. These results do not allow interpretation of causality, merely of association.

(iii) Improvement in general level of functioning:

The results presented pertaining to the reduction in incontinence and the improvement in toilet behaviour are considered to be the most relevant results in the evaluation of the effect of the experimental influence (i.e. the toilet training programme). However, a further aim of the study was to monitor the effects of toilet training on patients' behaviour - that is, their general level of functioning. The P-PAC data provides data for this evaluation.

It is previously noted that the P-PAC provides a measure of level of functioning which can be compared at intervals for the same patient, i.e. it permits intra-subject evaluation. The P-PEI provides the means of inter-subject comparison. It is, however, not useful in relation to this research sample due to the wide range (5 - 20 years) than the P-PEI contains (3 - 7/8 years). Inter-subject and inter-group comparison is made in the present analysis on the basis of comparing 'scores'. The scores entail the totals of the number of skills credited.

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Footnote: In calculations of P-PAC data for the selection procedure, the practise of occasionally using partial credit (as advised in the Manual), was followed. Only the final group totals were rounded up. The analysis presented forthwith is based on a revision of original data, all partial credits being rounded up to become full credits. Thus, there will appear to be a small discrepancy between figures presented in relation to P-PAC scores as a subject variable at the selection procedure, and those presented as results of the experiment. Results appearing in publication are based on the original scores.

Detailed analysis of P-PAC data is not presented in this section, calculations providing only preliminary results pertaining to the experimental group (E I). Table 49 contains P-PAC scores of patients in the group at the pre- and post-experimental assessments on the total P-PAC and its four quadrants.

Table 50 contains the P-PAC scores of the group as a whole at the pre- and post- experimental assessments. (The number itself and the proportion (%) of the total possible score is provided in view of the varying number of skills contained in each quadrant). Table 51 shows the number, the mean number per patient and the percentage gain of skills on the total P-PAC and its four quadrants. From these two tables it is clear that there is an increase in the number of skills on the total P-PAC (to 1074 from 749) and on each of the four quadrants. The percentage gain over baseline on the total P-PAC score is 13.89% (from 32.00% to 45.89%). The 'self-help' quadrant has both the highest pre-experimental score/percentage credit (n = 289; % = 39.15) and the highest post-experimental score (n = 414; % = 56.09%); and shows the greatest percentage gain over baseline (16.94%). The mean number of skills gained per patient is 6.94. The 'communication' quadrant in contrast has the lowest pre-experimental percentage score (25.73%), the lowest post-experimental percentage score (35.67%) and the smallest percentage gain over baseline (9.94%). The 'socialisation' quadrant has the second lowest pre-experimental percentage score (27.51%) and the second lowest post-experimental percentage score (42.59%), with a percentage gain over baseline of 15.08%. The 'occupation' quadrant shows a percentage gain over baseline (from 33.35% to 47.22%) of 13.89%, exactly equal to the percentage gain on the total P-PAC.

Figure 29: Pie graphs showing the pre- and post-experimental percentage scores and experimental gain on the total P-PAC (and the

four quadrants) present the above data graphically. This presentation has the advantage of showing the relative percentage scores and, perhaps more importantly, the proportion of 'no score'. Emphasis on gain perhaps detracts from an appreciation of the low proportion scored on the pre-experimental assessment, and of the low proportion at post-experimental assessment, despite this gain. The 'self-help' quadrant is the only one to show a score greater than 50.00%, the score at the post-experimental assessment being 56.09%.

The above results show an improvement in the P-PAC scores at the post-experimental assessment for the experimental group as a whole. This improvement pertains to the whole P-PAC and each quadrant in it. Table 52 contains the total P-PAC scores for patients in the group and shows that this improvement is obtained by every patient. It can be seen, however, that there is a wide range of scores at the pre-experimental assessment (range of 25 - 73), and at the post-experimental assessment (range of 36 - 94). The number of skills gained ranges from 5 - 30. The percentage gain over baseline ranges from 3.8% - 23.1%. 13 patients show a percentage gain of 10% or more and 5 patients (Ps. 48, 36, 44, 27 and 02) a gain of less than 10%.

Some indication of these ranges and variations within the group can be obtained from the illustrations (Figures 30-32). Figure 30 presents the pre- and post-experimental P-PAC s of the 'average' patient in the experimental group. This is purely hypothetical in that scores are based on the mean score per patient in each quadrant and no account is taken of deviations from a perfectly ordered sequential acquisition of skills and progress. However, it provides a visual picture of the approximate average attainment level of the group before and after the experiment. This can then be compared with Figures 31 and 32. Figure 31 contains the actual P-PAC of P.27 at the pre-and post-experimental

Table 49 : P-PAC scores of the experimental group(EI) at the pre- and post-experimental assessments of Experiment I.

| | | SELF - HELP | | COMMUN-ICATION | | SOCIAL-ISATION | | OCCUP-ATION | | TOTAL P-PAC | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | n | | % | | Gain | |
| Pair | Code | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | % Pre- | % Post- | % Gain | No Skills Gained |
| 1 | 53 | 22 | 30 | 22 | 28 | 13 | 17 | 16 | 19 | 73 | 94 | 56·2 | 72·3 | 16·1 | 21 |
| 2 | 40 | 24 | 30 | 9 | 14 | 3 | 7 | 17 | 23 | 53 | 74 | 40·8 | 56·9 | 16·1 | 21 |
| 3 | 49 | 24 | 32 | 10 | 15 | 8 | 13 | 14 | 25 | 56 | 85 | 43·1 | 65·4 | 22·3 | 29 |
| 4 | 01 | 18 | 26 | 8 | 13 | 7 | 13 | 13 | 18 | 46 | 70 | 35·4 | 53·8 | 18·4 | 24 |
| 5 | 05 | 14 | 23 | 7 | 14 | 6 | 8 | 8 | 14 | 35 | 59 | 26·9 | 45·4 | 18·5 | 24 |
| 6 | 26 | 13 | 24 | 8 | 15 | 5 | 7 | 7 | 14 | 33 | 60 | 25·4 | 46·2 | 20·8 | 27 |
| 7 | 22 | 8 | 20 | 10 | 15 | 5 | 13 | 8 | 13 | 31 | 61 | 23·8 | 46·9 | 23·1 | 30 |
| 8 | 19 | 15 | 22 | 6 | 11 | 3 | 6 | 8 | 12 | 32 | 51 | 24·6 | 39·2 | 14·6 | 19 |
| 9 | 18 | 15 | 23 | 8 | 13 | 5 | 7 | 7 | 9 | 35 | 52 | 26·9 | 40·00 | 13·1 | 17 |
| 10 | 28 | 18 | 26 | 14 | 15 | 5 | 11 | 10 | 16 | 47 | 68 | 36·2 | 52·3 | 16·1 | 21 |
| 11 | 04 | 20 | 27 | 9 | 13 | 7 | 11 | 16 | 23 | 52 | 74 | 40·00 | 56·9 | 16·9 | 22 |
| 12 | 10 | 13 | 22 | 9 | 10 | 2 | 3 | 6 | 9 | 30 | 44 | 23·1 | 33·8 | 10·7 | 14 |
| 13 | 48 | 15 | 21 | 12 | 13 | 6 | 8 | 10 | 10 | 43 | 52 | 33·1 | 40·0 | 6·9 | 9 |
| 14 | 45 | 15 | 23 | 16 | 17 | 11 | 12 | 12 | 16 | 54 | 68 | 41·5 | 52·3 | 10·8 | 14 |
| 15 | 36 | 14 | 18 | 2 | 7 | 1 | 2 | 8 | 10 | 25 | 37 | 19·2 | 28·5 | 9·3 | 12 |
| 16 | 44 | 11 | 13 | 8 | 10 | 6 | 7 | 7 | 8 | 32 | 38 | 24·6 | 29·2 | 4·6 | 6 |
| 17 | 27 | 12 | 14 | 9 | 10 | 3 | 7 | 2 | 5 | 26 | 36 | 20·0 | 27·7 | 7·7 | 10 |
| 18 | 02 | 18 | 20 | 9 | 11 | 8 | 9 | 11 | 11 | 46 | 51 | 35·4 | 39·2 | 3·8 | 5 |
| Totals. | | 289 | 414 | 176 | 244 | 104 | 161 | 180 | 255 | 749 | 1074 | | | | 325 |

Table 50: P-PAC scores of the experimental group (E I) at pre- and post-experimental assessments.

| P-PAC | Number of skills | Scores (N) Pre-Experimental N | % | Post-Experimental N | % |
|---|---|---|---|---|---|
| TOTAL | 130 | 749 | 32.00 | 1074 | 45.89 |
| 'self-help' | 41 | 289 | 39.15 | 414 | 56.09 |
| 'communication' | 38 | 176 | 25.73 | 244 | 35.67 |
| 'socialisation' | 21 | 104 | 27.51 | 161 | 42.59 |
| 'occupation' | 30 | 180 | 33.33 | 255 | 47.22 |

Table 51: Number, mean number per patient, and percentage of gain in scores of the experimental group (E I) during the experiment on the P-PAC.

| P-PAC | Pre-Exp. Score. | Post-Exp. Score | Number of skills gained | Mean gain per patient | percentage gain over baseline. |
|---|---|---|---|---|---|
| 'self-help' | 289 | 414 | 125 | 6.94 | 16.94% |
| 'communication' | 176 | 244 | 68 | 3.77 | 9.94% |
| 'socialisation' | 104 | 161 | 57 | 3.16 | 15.05% |
| 'occupation' | 180 | 255 | 75 | 4.16 | 13.89% |
| 'TOTAL P-PAC | 749 | 1074 | 325 | 18.05 | 13.89% |

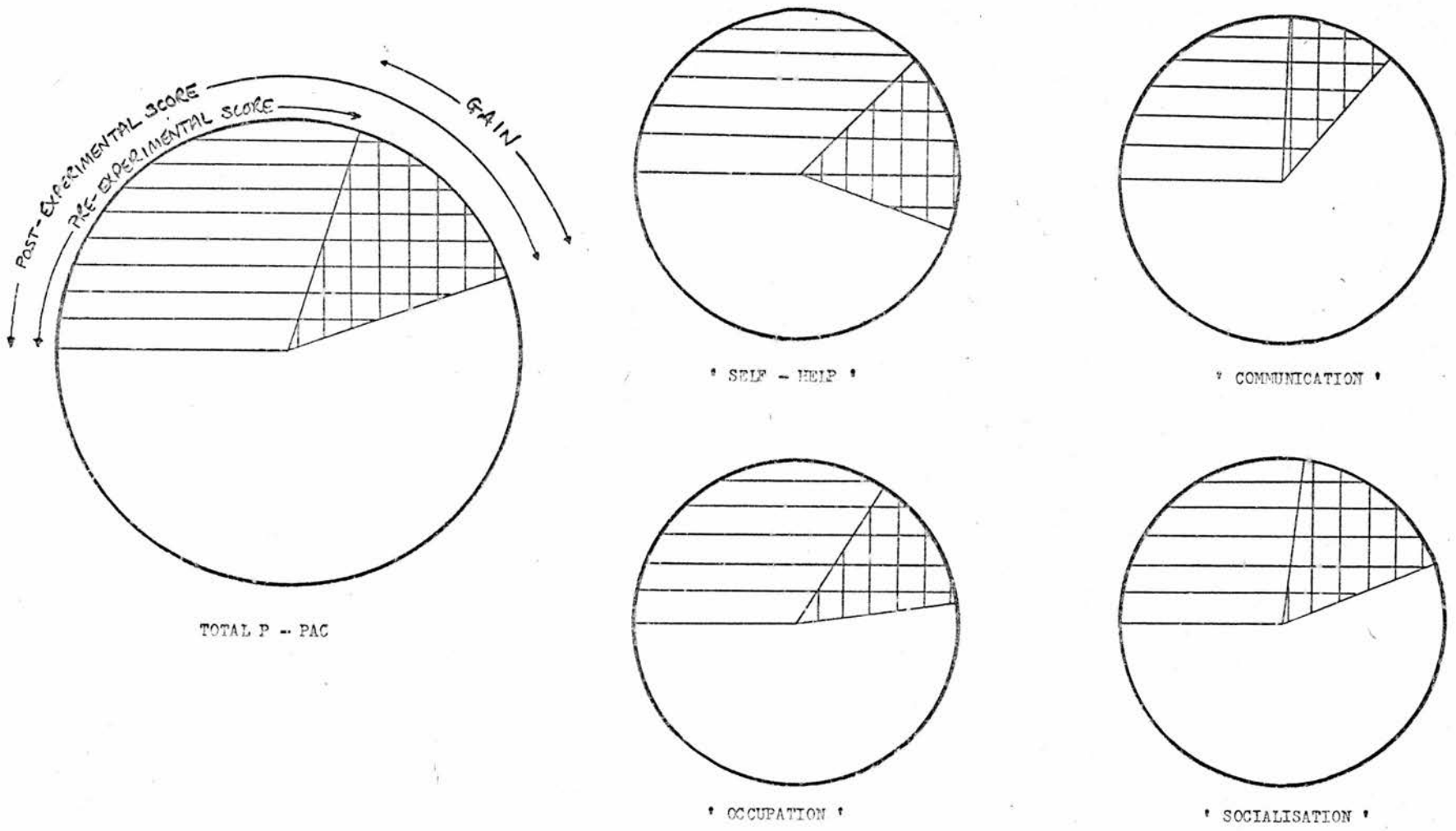


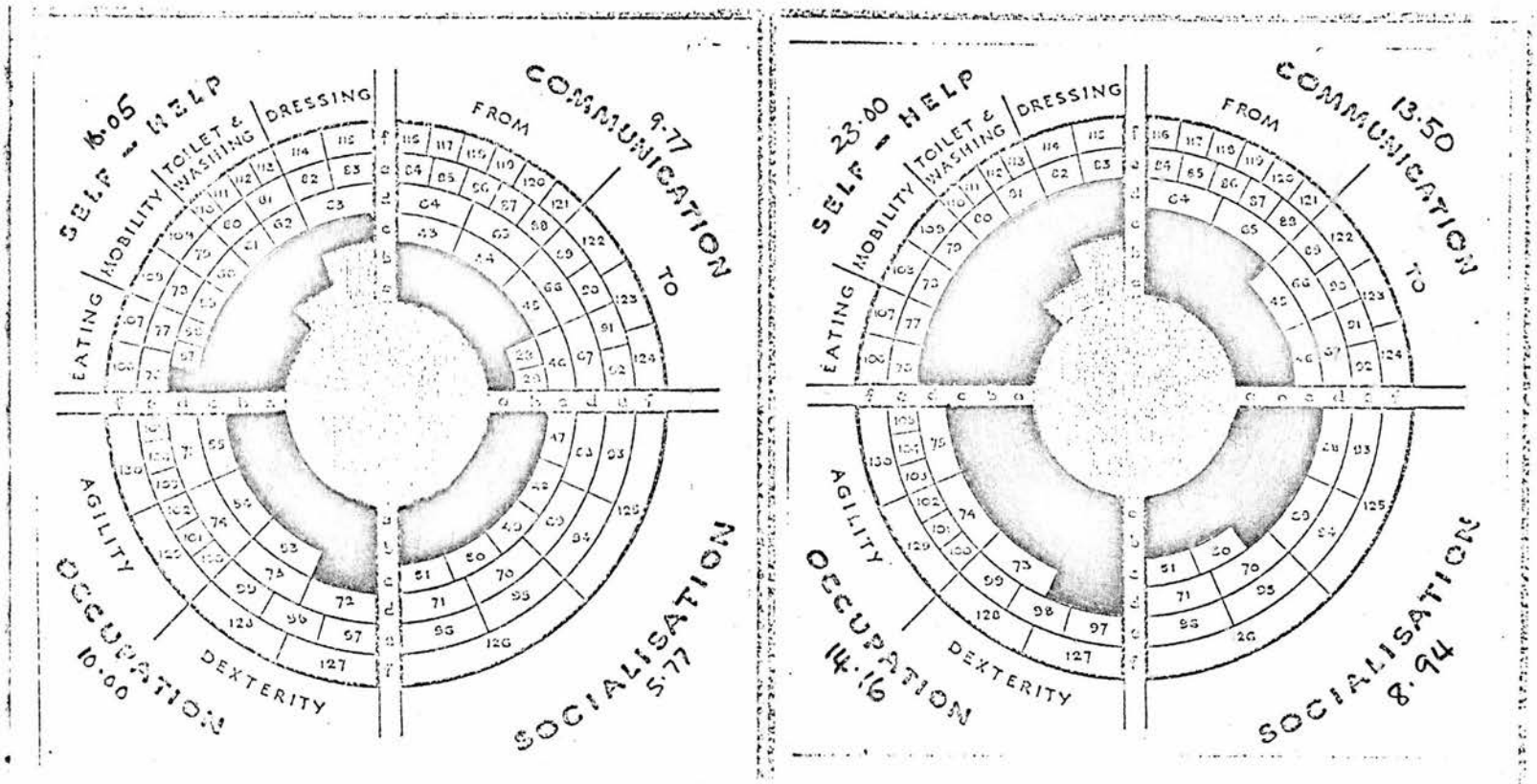

Figure 29 : Pie graphs showing pre- and post-experimental scores, and experimental gain, of the experimental group (EI) on the total P-PAC and its quadrants.

Table 52: Pre- and post-experimental scores on total P-PAC and percentage gain over baseline for patients in the Experimental group (E I).

| Patients | | Total P-PAC | | Gain | |
|---|---|---|---|---|---|
| | | Pre-exp. score | Post-exp score | N | % |
| 1 | 53 | 73 | 94 | 21 | 16.1 |
| 2 | 40 | 53 | 74 | 21 | 16.1 |
| 3 | 49 | 56 | 85 | 29 | 22.3 |
| 4 | 01 | 46 | 70 | 24 | 18.4 |
| 5 | 05 | 35 | 59 | 24 | 18.4 |
| 6 | 26 | 33 | 60 | 27 | 20.8 |
| 7 | 22 | 31 | 61 | 30 | 23.1 |
| 8 | 19 | 32 | 51 | 19 | 14.6 |
| 9 | 18 | 35 | 52 | 17 | 13.1 |
| 10 | 28 | 47 | 68 | 21 | 16.1 |
| 11 | 04 | 52 | 74 | 22 | 16.9 |
| 12 | 10 | 30 | 44 | 14 | 10.7 |
| 13 | 48 | 43 | 52 | 9 | 6.9 |
| 14 | 45 | 54 | 68 | 14 | 10.8 |
| 15 | 36 | 25 | 37 | 12 | 9.3 |
| 16 | 44 | 32 | 38 | 6 | 4.6 |
| 17 | 27 | 26 | 36 | 10 | 7.7 |
| 18 | 02 | 46 | 51 | 5 | 3.8 |
| | | Range: 25 - 73 | Range= 36 - 94 | | |

PRE - EXPERIMENTAL

POST - EXPERIMENTAL



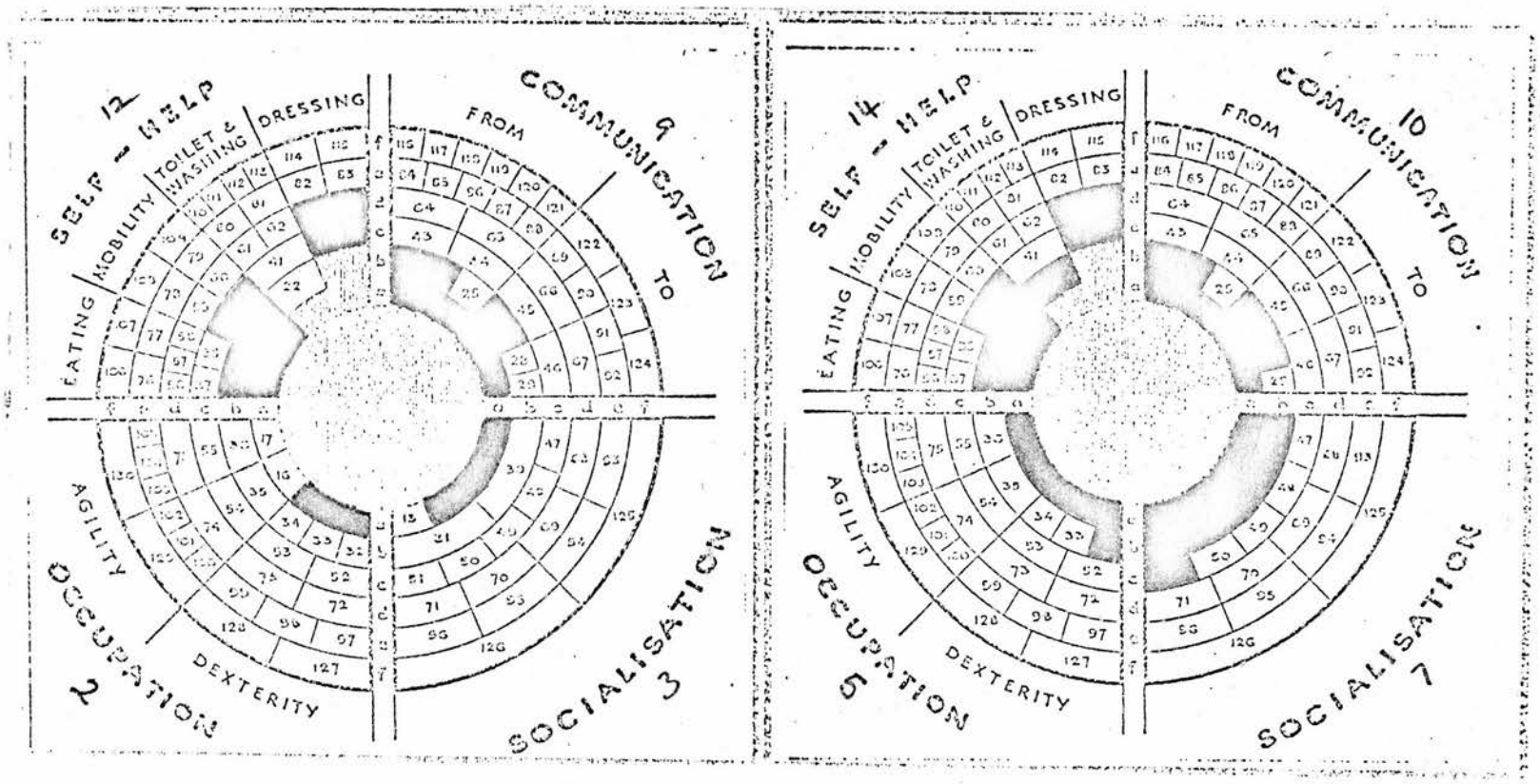

Total score = 41.59

Total score = 59.60
(Gain over baseline = 13.89%)

Figure 30 : P-PAC at pre- and post-experimental assessments for the 'average' patient of the experimental group (EI).

PRE - EXPERIMENTAL

POST - EXPERIMENTAL



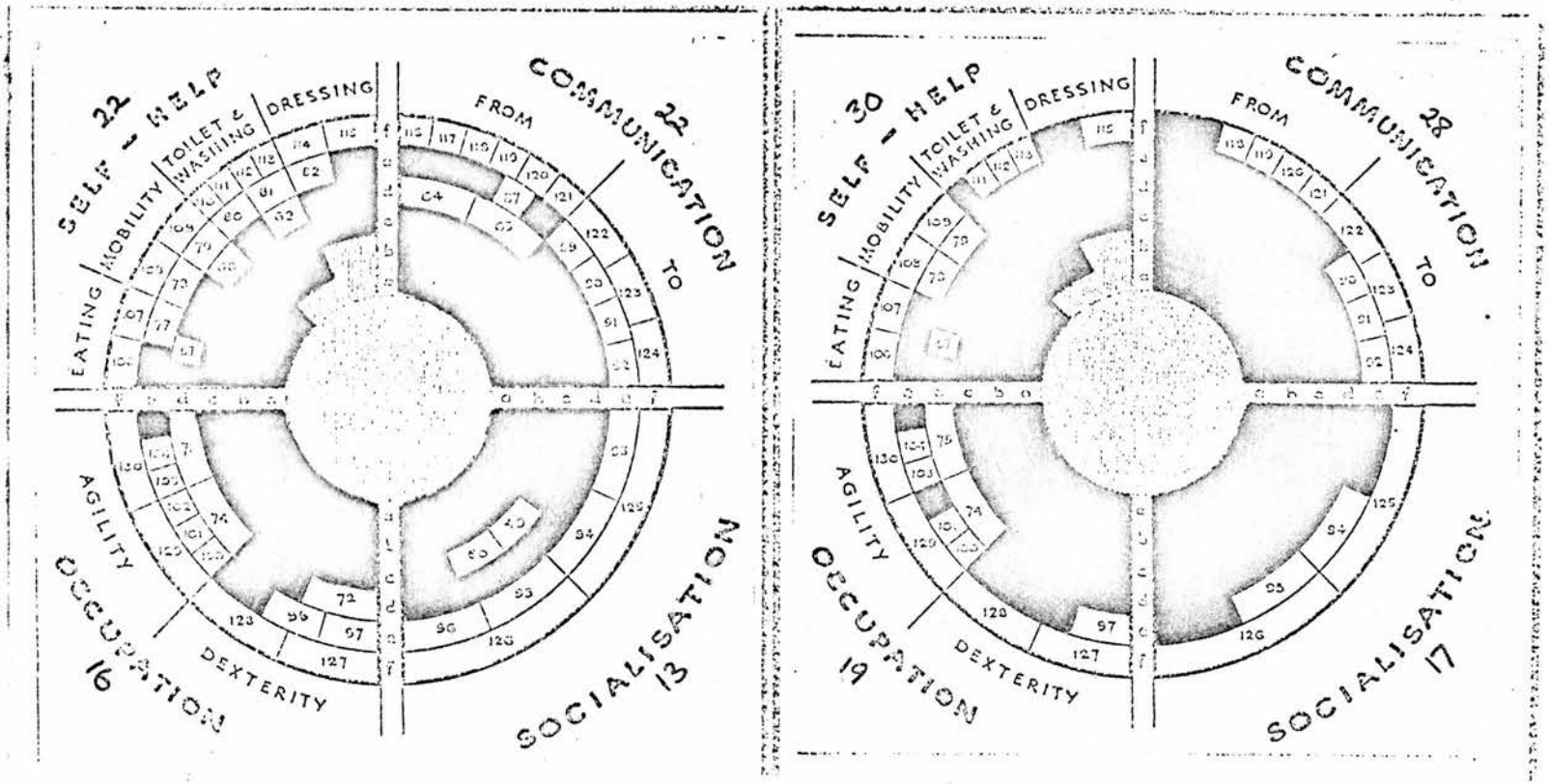

Total score = 26

Total score = 36
( Gain over baseline = 7.7%)

Figure 31 : P-PAC at pre- and post-experimental assessments for Patient 27 (EI). Example of 'below-average' score.

PRE - EXPERIMENTAL

POST- EXPERIMENTAL




Total score = 73

Total score = 94
(Gain over baseline = 16.1%)

Figure 32 : P-PAC at pre- and post-experimental assessments for Patient 53 (EI) : Example of 'above-average' scores.

Table 53: Rank-difference correlation (Spearman RHO ) between total P-PAC scores at the pre-experimental+post-experimental assessments of Experiment I.

| Patient | | Pre-Exp. Score | Post-Exp. Score | D | $D^2$ |
|---|---|---|---|---|---|
| 53 | 1 | 1 | 1 | 0 | 0 |
| 40 | 2 | 4 | 3.5 | +0.5 | 0.25 |
| 49 | 3 | 2 | 2 | 0 | 0 |
| 01 | 4 | 7.5 | 5 | +2.5 | 6.25 |
| 05 | 5 | 10.5 | 10 | +0.5 | 0.25 |
| 26 | 6 | 12 | 9 | +3 | 9 |
| 22 | 7 | 15 | 8 | +7 | 49 |
| 19 | 8 | 13.5 | 13.5 | 0 | 0 |
| 18 | 9 | 10.5 | 11.5 | -1 | 1 |
| 28 | 10 | 6 | 6.5 | -0.5 | 0.25 |
| 04 | 11 | 5 | 3.5 | +1.5 | 2.25 |
| 10 | 12 | 16 | 15 | +1 | 1 |
| 48 | 13 | 9 | 11.5 | -2.5 | 6.25 |
| 45 | 14 | 3 | 6.5 | -3.5 | 12.25 |
| 36 | 15 | 18 | 17 | +1 | 1 |
| 44 | 16 | 13.5 | 16 | -2.5 | 6.25 |
| 27 | 17 | 17 | 18 | -1 | 1 |
| 02 | 18 | 7.5 | 13.5 | -6 | 36 |

N =18

$$p = 1 - \frac{6\Sigma D^2}{N(N^2 - 1)} = .87$$

$\Sigma D^2 = 132$

p (18) = + .87, $p < .01$

Table 54 : Rank-difference correlation (Spearman RHO ) between percentage scores (total P -- PAC) at the pre-experimental assessment and percentage increase over baseline at the post-experimental assessment of Experiment I.

| Patient | | Pre-Exp. Score (%) | Percentage Gain | D | $D^2$ |
|---|---|---|---|---|---|
| 53 | 1 | 1 | 8 | -7 | 49 |
| 40 | 2 | 4 | 8 | -4 | 16 |
| 49 | 3 | 2 | 2 | 0 | 0 |
| 01 | 4 | 7.5 | 4.5 | +3 | 9 |
| 05 | 5 | 10.5 | 4.5 | +6 | 36 |
| 26 | 6 | 12 | 3 | +9 | 81 |
| 22 | 7 | 15 | 1 | +14 | 196 |
| 19 | 8 | 13.5 | 10 | +3.5 | 12.25 |
| 18 | 9 | 10.5 | 11 | -0.5 | 0. 25 |
| 28 | 10 | 6 | 8 | -2 | 4 |
| 04 | 11 | 5 | 6 | -1 | 1 |
| 10 | 12 | 16 | 13 | +3 | 9 |
| 48 | 13 | 9 | 16 | -7 | 49 |
| 45 | 14 | 3 | 12 | -9 | 81 |
| 36 | 15 | 18 | 14 | +4 | 16 |
| 44 | 16 | 13.5 | 17 | -3.5 | 12.25 |
| 27 | 17 | 17 | 15 | +2 | 4 |
| 02 | 18 | 7.5 | 18 | -10.5 | 110.25 |

N = 18

$$p = 1 - \frac{6 \Sigma D^2}{N (N^2 - 1)} = 0.30$$

$\Sigma D^2$ = 686

assessments. This patient illustrates an attainment level well below the average. His pre-experimental score (of 26) is the second lowest score within the group and his post-experimental score (of 36) is the lowest within the group. His percentage gain over baseline totals 7.7%, this being the fourth lowest gain within the group. Figure 32 provides the other extreme. P.53 has the highest score both pre- and post-experimentally (pre= 73; post=94). His P-PAC picture illustrates an attainment level well above the average for the group.

These 2 patients (Ps. 53 and 27), by virtue of their scores, suggest that there may be an association between the pre-experimental score and the post-experimental score. This association is explored in relation to the group as a whole by rank difference correlation analysis. Table 53 shows a rank-difference correlation between total P-PAC scores at the pre-experimental assessment and at the post-experimental assessment. The correlation coefficient is +0.87 and is significant at the 1% level ($p\ (18) + .87$, $p < .01$). Table 54 shows a rank difference correlation between percentage scores on the total P-PAC at the pre-experimental assessment and percentage increase over baseline. The correlation coefficient is + 0.30 and is not significant ($p\ (18) = +.30$). This analysis, using Spearman's rank-difference correlation shows that while there is a highly significant correlation between pre- and post-experimental scores, there is not a significant correlation between baseline scores and subsequent gain over baseline.

In summary, several results are obtained from preliminary analysis of P-PAC assessments in the pre- and post-experimental phases. The mean score per patient on each quadrant and on the total P-PAC is low at the pre-experimental assessment (less than 50% possible score) and, despite improvement, remains at a low level at the post-experimental assessment. There is improvement in the general level of functioning of the group as a whole. This improvement pertains to the total P-PAC and to each quadrant, with the greatest percentage

increase over baseline occuring in the 'self-help' quadrant. All patients in the group show improvement, both overall and within each quadrant. There is a wide range within the group in terms of pre-experimental score, post-experimental score and percentage gain over baseline. There is a highly significant correlation between the rank-order of pre- and post-experimental scores, but not the same between baseline scores and subsequent gain over baseline.

2. Results pertaining to the control group (C I):-

(i) No reduction in incontinence, prevalence of total incontinence, use of nappies:-

Data gained from the recording of elimination response rates in the pre- and post-experimental phases for the control group (C I) are contained in full in Appendix 2. Data are shown for each patient on each of the 30 days of recording in each phase, each day being the 24 hour period (from 7.00 a.m. - 7.00 a.m.). Tables 55 - 59 are derived from these raw data.

From Table 55, which shows the number and proportion of elimination responses at the pre- and post-experimental phases, it can be seen that there is no reduction in the number of incontinent eliminations at the post-experimental phase. In the pre-experimental phase tht total number of incontinent eliminations is 2279, this representing 72.71% of all eliminations. In the post-experimental phase the total number is 2647 which is 75.13% of all eliminations. It can be seen, therefore, that there is in fact a slight increase in the total number of incontinent eliminations. When the response rates of individual patients are studied (see Table 57), it is clear that this increase arises in relation to

the majority of patients. Two points require to be clarified in this context. Firstly, there is incomplete recording on P 51 in the pre-experimental phase (only 7 days' recording), this being responsible for an increase in the post- experimental frequency of incontinent eliminations. Secondly, there is an increased number of incontinent eliminations in those patients (pairs 6 - 18) maintained in nappies before and after the experiment. This increase reflects an increase in the number of nappy changes per day rather than an increase in the number of incontinent eliminations per se. The post-experimental phase was undertaken in winter time (Jan/Feb) whereas the pre-experimental phase fell in summertime. It is nursing policy in Lewis Ward to increase the number of nappies changes per day in cold whether to prevent patients catching cold. It is apparent already, from previous results, that the practice of maintaining incontinent patients in nappies presents a confounding influence on results based on response frequency.

There is a small increase at the post-experimental phase in the total number of all elimination responses (from 3134 to 3523): See Table 55. This is accompanied by an increase in the daily average response frequency from 104.47 per day in the pre-experimental phase to 117. 43 in the post-experimental phase (see Table 56). Although there is a slight increase in the number of eliminations in the toilet at the post-experimental phase (855 to 876), the daily average increasing from 28.50 to 29.20, the proportion of all elimination responses decreases from 27.28 in the pre-experimental phase to 24.86 in the post-experimental phase.

Table 57 contains the numbers of elimination responses (all eliminations, incontinent eliminations and eliminations in the toilet) for each patient in the control group (C I) at the pre- and post-experimental

phases. This clearly shows the higher response rate in patients not maintained in nappies (pairs 1 - 5 incl). Those patients maintained in nappies at both phases show a small number of eliminations in the toilet at the pre-experimental phase and none in the post-experimental phase. From Appendix 2 it can be seen that these eliminations in the toilet occur almost exclusively within the first two or three days of recording. This suggests either faulty recording or toileting of patients not previously toileted.

Table 58 shows the degree of incontinence of patients in the control group at the pre- and post-experimental phases. It is clear that there is no real change in the degree between the two phases in relation to those patients maintained in nappies (pairs 6 - 18 incl). Some change is apparent, however, in relation to those 5 patients (Ps. 51, 31, 32, 15, 30) previously in toilet status group 2 (i.e. "being potty trained"). These patients continued to be potty trained by the conventional method throughout the experimental phase. 4 of the patients (Ps. 51, 31, 32 and 30) show an increase in their degree of incontinence at the post-experimental phase. One of the patients (P 15) shows a decrease, i.e. improvement in terms of reduction in incontinence. Of the 4 patients with an increase in degree of incontinence, in 2 (Ps 31 and 30) cases this is negligible (5% and 8%); and, in the other 2 cases (Ps 51 and 32), the increase is greater. P 51 shows an increase of 14%. That an incomplete recording was obtained in the pre-experimental phase requires to be noted as this detracts from accurate comparison. P 32 shows an increase of 13%. Examination of cumulative records of response rates on this patient shows that, in the post-experimental phase, there was a higher frequency of faecal elimination and faecal incontinence in the post-experimental phase. In the pre-experimental phase, the total number

Table 55: Comparison of total number of elimination responses (incontinent and toilet) in the control group (C I) at the pre- and post-experimental phases.

| Elimination Responses | Pre-Experimental N | Pre-Experimental % | Post Experimental N | Post Experimental % |
|---|---|---|---|---|
| Incontinent eliminations | 2279 | 72.71 | 2647 | 75.13 |
| Eliminations in toilet | 855 | 27.28 | 876 | 24.86 |
| All elimination responses | 3134 | 100 | 3523 | 100 |

Table 56: Average number of elimination responses per day in the control group (C I) during the pre- and post-experimental phases (30 days).

| Elimination responses | N | | Daily average (n) | |
|---|---|---|---|---|
| | Pre- Exp | Post-Exp | Pre-exp | Post-exp. |
| All elimination responses | 3134 | 3523 | 104.47 | 117.43 |
| Incontinent eliminations | 2279 | 2647 | 75.96 | 88.23 |
| Eliminations in toilet | 855 | 876 | 28.50 | 29.20 |

Table 57 : Total numbers of elimination responses (all eliminations, incontinent eliminations and eliminations in the toilet) of the patients in the control group (CI) at the pre- and post-experimental phases. (30 days)

| PATIENTS | | ALL ELIMINATION RESPONSES | | INCONTINENT ELIMINATIONS | | ELIMINATIONS IN TOILET | |
|---|---|---|---|---|---|---|---|
| Pair | Code | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. |
| 1 | 51 | 51 * | 249 | 19 | 128 | 32 | 121 |
| 2 | 31 | 324 | 304 | 104 | 111 | 220 | 193 |
| 3 | 32 | 326 | 283 | 63 | 91 | 263 | 192 |
| 4 | 15 | 256 | 304 | 126 | 120 | 130 | 184 |
| 5 | 30 | 222 | 269 | 51 | 83 | 171 | 186 |
| 6 | 25 | 147 | 163 | 144 | 163 | 3 | 0 |
| 7 | 17 | 149 | 166 | 149 | 166 | 0 | 0 |
| 8 | 16 | 153 | 163 | 149 | 163 | 4 | 0 |
| 9 | 42 | 157 | 174 | 154 | 174 | 3 | 0 |
| 10 | 39 | 141 | 149 | 139 | 149 | 2 | 0 |
| 11 | 21 | 145 | 169 | 142 | 169 | 3 | 0 |
| 12 | 38 | 152 | 139 | 148 | 139 | 4 | 0 |
| 13 | 14 | 154 | 174 | 151 | 174 | 3 | 0 |
| 14 | 08 | 147 | 146 | 145 | 146 | 2 | 0 |
| 15 | 35 | 153 | 162 | 149 | 162 | 4 | 0 |
| 16 | 29 | 155 | 176 | 152 | 176 | 3 | 0 |
| 17 | 11 | 152 | 163 | 147 | 163 | 5 | 0 |
| 18 | 07 | 150 | 170 | 147 | 170 | 3 | 0 |
| | Totals: | 3134 | 3523 | 2279 | 2647 | 855 | 876 |

* Incomplete recording.

Table 58: Degree of incontinence of patients in the control group (C I) at the pre- and post-experimental phases.

$$\text{Degree of incontinence} = \frac{\text{No. of incontinent eliminations}}{\text{No. of all eliminations}} \times 100$$

| Patient | | Degree of incontinence (%) | | |
|---|---|---|---|---|
| Pair | Code | Pre-experimental | Post experimental | Difference |
| 1 | 51 | 37 | 51 | + 14 |
| 2 | 31 | 32 | 37 | + 5 |
| 3 | 32 | 19 | 32 | + 13 |
| 4 | 15 | 49 | 39 | - 10 |
| 5 | 30 | 23 | 31 | + 8 |
| 6 | 25 | 98 | 100 | + 2 |
| 7 | 17 | 100 | 100 | 0 |
| 8 | 16 | 97 | 100 | + 3 |
| 9 | 42 | 99 | 100 | + 1 |
| 10 | 39 | 99 | 100 | + 1 |
| 11 | 21 | 98 | 100 | + 2 |
| 12 | 38 | 97 | 100 | + 3 |
| 13 | 14 | 98 | 100 | + 2 |
| 14 | 08 | 99 | 100 | + 1 |
| 15 | 35 | 97 | 100 | + 3 |
| 16 | 29 | 98 | 100 | + 2 |
| 17 | 11 | 97 | 100 | + 3 |
| 18 | 07 | 98 | 100 | + 2 |

Table 59: Distribution of patients in the control group (C I) by percentage degree of incontinence at the pre- and post-experimental phases.

| Percentile Degree of incontinence | Number of Patients | |
|---|---|---|
| | Pre-Exp. | Post-Exp. |
| 90 - 100% | 13 | 13 |
| 80 - 89% | 0 | 0 |
| 70 - 79% | 0 | 0 |
| 60 - 69% | 0 | 0 |
| 50 - 59% | 0 | 1 |
| 40 - 49% | 1 | 0 |
| 30 - 39% | 2 | 4 |
| 20 - 29% | 1 | 0 |
| 10 - 19% | 1 | 0 |
| 0 - 9% | 0 | 0 |
| | n = 18 | n = 18 |

Table 60: Prevalence of total incontinence in the control group (C I) before and after Experiment I

| | Number of patients/ % of group | | | |
|---|---|---|---|---|
| | Totally Incontinent | | Not Totally Incontinent | |
| Pre-experimental phase | 13 | 72.22% | 5 | 27.78% |
| Post-experimental phase | 13 | 72.22% | 5 | 27.78% |

Table 61: Use of nappies in the control group (C.I.) before and after Experiment I

| | Number of patients/ % of group maintained in napoies | |
|---|---|---|
| Pre-experimental phase | 13 | 72.22% |
| Post-experimental | 13 | 72.22% |

of faecal eliminations is 42, and 6 of these (14%) are incontinent. In the post-experimental phase, the total number of faecal eliminations is 88, and 47 of these (53%) are incontinent.

Table 59 shows the distribution of patients in the control group (C I) by percentage degree of incontinence at the pre- and post-experimental phases. The changes, discussed above, are apparent in this frequency distribution. The position of 13 patients (pairs 6 - 18) remains unchanged. There is some rearrangement in the position of the remaining 5 patients (pairs 1 - 5) in the lower half of the table.

Analysis of recording of response rates of the control group (C I) at the pre- and post-experimental phases provides clear evidence that there is no reduction of incontinence in the group as a whole, or in the majority of patients within the group. There is, in fact, an increase in the total number of all eliminations, this being attributable to an increase in the number of incontinent eliminations and a smaller increase in the number of eliminations in the toilet. The response rates of patients and their degree of incontinence show that the position of 13 patients, those maintained in nappies, remains virtually unchanged at the post-experimental phase. Of the remaining 5 patients, those previously "being potty trained" (this continuing throughout the experimental phase), there is little change in the position of two, an increase in the degree of incontinence in two, and a decrease in the degree of incontinence in one.

There is no change at the post-experimental phase in the prevalence of total incontinence in the control group or in the number of patients maintained in nappies (see Tables 60 and 61).

(ii) Minimal improvement in general level of functioning:

Table 62 contains P-PAC scores for patients in the control group

at the pre- and post-experimental assessments on the whole P-PAC and its four quadrants.

Table 63 contains the scores of the group as a whole and the proportion of the possible score of the total P-PAC and the quadrants. This shows that there is an overall increase in score (from 813 to 882) and an increase in score on each of the four quadrants for the whole group. Table 64 further breaks down these figures to show the number of skills gained by the group, the mean number gained per patient, and the percentage gain over baseline in the group. The overall gain of 69 skills represents a percentage gain over baseline of 2.95%, and a mean gain per patient of 3.83 skills. The greatest number of skills gained, and the largest mean gain per patient occurs in the 'self-help' quadrant (23 skills gained; mean gain of 1.28 per patient). The percentage increase over baseline is 3.11%. The 'occupation' quadrant shows the highest percentage gain over baseline (3.52%), and the second-highest number of skills gained (19), and mean gain per patient (1.05). In the 'communication' quadrant there are 15 skills gained (mean of 0.83 per patient) with a percentage gain over baseline of 21.9%. In the 'socialisation' quadrant there are 12 skills gained (mean of 0.67 per patient) and a percentage gain over baseline of 3.17%.

These results show that, on the total P-PAC and the four quadrants, there is minimal improvement in the general level of functioning of the control group at the post-experimental phase. Examination of the scores of individual patients in the group shows that this result does not pertain to all patients (see Table 65).

Of the 18 patients in the control group, 3 patients (Ps 29, 11 and 07) show no improvement, their pre- and post-experimental scores being equal. These patients do not rank lowest at either the pre- and

Table 62 : P-PAC scores of patients in the control group (CI) at the pre- and post-experimental assessments of Experiment I.

| Patient | | SELF-HELP | | COMMUN-ICATION | | SOCIAL-ISATION | | OCCUP-ATION | | TOTAL P-PAC | | TOTAL P-PAC | | TOTAL GAIN(+)/LOSS(-) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pair | code | PRE | POST | PRE | POST | PRE | POST | PRE | POST | PRE | POST | % PRE | % POST | % GAIN | NO. SKILLS GAINED |
| 1 | 51 | 25 | 26 | 12 | 13 | 11 | 12 | 24 | 25 | 72 | 76 | 55·4 | 58·5 | 3·1 | + 4 |
| 2 | 31 | 20 | 23 | 11 | 11 | 6 | 8 | 10 | 13 | 47 | 55 | 36·2 | 42·3 | 6·1 | + 8 |
| 3 | 32 | 26 | 29 | 14 | 14 | 10 | 11 | 15 | 20 | 65 | 74 | 50·0 | 57·0 | 7·0 | + 9 |
| 4 | 15 | 20 | 23 | 11 | 13 | 10 | 10 | 16 | 18 | 57 | 64 | 43·8 | 49·2 | 5·4 | + 7 |
| 5 | 30 | 27 | 30 | 22 | 26 | 17 | 17 | 22 | 24 | 88 | 97 | 67·7 | 74·6 | 6·9 | + 9 |
| 6 | 25 | 10 | 12 | 6 | 6 | 6 | 6 | 5 | 7 | 27 | 31 | 20·8 | 23·8 | 3·0 | + 4 |
| 7 | 17 | 10 | 13 | 8 | 8 | 2 | 2 | 7 | 6 | 27 | 29 | 20·8 | 22·3 | 1·5 | + 2 |
| 8 | 16 | 12 | 12 | 9 | 9 | 2 | 2 | 2 | 1 | 25 | 24 | 19·2 | 18·5 | -0·7 | − 1 * |
| 9 | 42 | 19 | 22 | 10 | 15 | 9 | 12 | 13 | 18 | 51 | 67 | 39·2 | 51·5 | 12·3 | + 16 |
| 10 | 39 | 15 | 15 | 10 | 11 | 6 | 7 | 12 | 11 | 43 | 44 | 33·1 | 33·9 | 0·8 | + 1 |
| 11 | 21 | 15 | 17 | 20 | 22 | 10 | 12 | 10 | 12 | 55 | 63 | 42·3 | 48·5 | 6·2 | + 8 |
| 12 | 38 | 12 | 12 | 10 | 10 | 3 | 3 | 0 | 0 | 25 | 25 | 19·2 | 19·2 | 0 | 0 |
| 13 | 14 | 14 | 14 | 9 | 9 | 3 | 3 | 10 | 11 | 36 | 37 | 27·7 | 28·5 | 0·8 | + 1 |
| 14 | 08 | 11 | 12 | 16 | 16 | 11 | 11 | 17 | 15 | 55 | 54 | 42·3 | 41·5 | -0·8 | − 1 * |
| 15 | 35 | 17 | 16 | 8 | 9 | 3 | 5 | 13 | 13 | 41 | 43 | 31·5 | 33·1 | 1·6 | + 2 |
| 16 | 29 | 11 | 11 | 9 | 9 | 3 | 3 | 10 | 10 | 33 | 33 | 25·4 | 25·4 | 0 | 0 |
| 17 | 11 | 12 | 12 | 8 | 7 | 5 | 5 | 9 | 10 | 34 | 34 | 26·2 | 26·2 | 0 | 0 |
| 18 | 07 | 10 | 10 | 8 | 8 | 5 | 5 | 9 | 9 | 32 | 32 | 24·6 | 24·6 | 0 | 0 |
| | | 286 | 309 | 201 | 216 | 122 | 134 | 204 | 223 | 813 | 882 | | | | + 69 |

* Losses.

Table 63: P-PAC scores of the control group (C I) at the pre- and post- experimental assessments of Experiment I

| P-PAC | No. of skills | Scores | | | |
|---|---|---|---|---|---|
| | | Pre-Experimental | | Post-Experimental | |
| | | N | % | N | % |
| Total | 130 | 813 | 34.74 | 882 | 37.69 |
| 'self-help' | 41 | 286 | 38.75 | 309 | 41.86 |
| 'communic-ation' | 38 | 201 | 29.38 | 216 | 31.57 |
| 'socialis-ation' | 21 | 122 | 32.27 | 134 | 35.44 |
| 'occupat-ion' | 30 | 204 | 37.77 | 223 | 41.29 |

Table 64: Number, mean number per patient, and percentage gain of P-PAC scores in the control group (C I)

| P-PAC | Pre-Exp score | Post-Exp score | No. of skills gained | Mean gain per patient | % gain over baseline |
|---|---|---|---|---|---|
| 'self-help' | 286 | 309 | 23 | 1.28 | 3.11% |
| 'communica-tion | 201 | 216 | 15 | 0.83 | 2.19% |
| 'socialisa-tion | 122 | 134 | 12 | 0.67 | 3.17% |
| 'occupation | 204 | 223 | 19 | 1.05 | 3.52% |
| TOTAL P-PAC | 813 | 882 | 69 | 3.83 | 2.95% |

Table 65: Pre- and post-experimental scores on total P-PAC and percentage gain over baseline for patients in the control group (C I).

| Patients | | TOTAL P-PAC Pre- exp score | Post-exp score | Gain | % gain |
|---|---|---|---|---|---|
| 1 | 51 | 72 | 76 | 4 | 3.1 |
| 2 | 31 | 47 | 55 | 8 | 6.1 |
| 3 | 32 | 65 | 74 | 9 | 7.0 |
| 4 | 15 | 57 | 64 | 7 | 5.4 |
| 5 | 30 | 88 | 97 | 9 | 6.9 |
| 6 | 25 | 27 | 31 | 4 | 3.0 |
| 7 | 17 | 27 | 29 | 2 | 1.5 |
| 8 | 16 | 25 | 24 | -1 | -0.7 |
| 9 | 42 | 51 | 67 | 16 | 12.3 |
| 10 | 39 | 43 | 44 | 1 | 0.8 |
| 11 | 21 | 55 | 63 | 8 | 6.2 |
| 12 | 38 | 25 | 25 | 0 | 0 |
| 13 | 14 | 36 | 37 | 1 | 0.8 |
| 14 | 08 | 55 | 54 | -1 | -0.8 |
| 15 | 35 | 41 | 43 | 2 | 1.6 |
| 16 | 29 | 33 | 33 | 0 | 0 |
| 17 | 11 | 34 | 34 | 0 | 0 |
| 18 | 07 | 32 | 32 | 0 | 0 |
| | | Range: 25-88 | Range: 24 - 97 | | |

post-experimental assessments. Two patients (Ps 16 and 08) show a decrease(of 1) in their total scores at the post-experimental assessment. The remaining 13 patients all show increases in the total score, the number of skills gained ranging from 1 (Ps 39 and 14) to 16 (P. 42). The percentage gain over baseline (in these 13 cases) ranges from 0.8% to 12.3%

3. Comparison of results pertaining to the control group and those pertaining to the experimental group.

So far, results of Experiment I have been presented (in terms of comparison of pre- and post-experimental data) separately for the experimental group and the control group. It is evident that, in the post-experimental phase, the experimental group showed a reduction in incontinence (in terms of decreased frequency of elimination response rates, lowered prevalence of total incontinence, and reduction in the number of patients maintained in nappies); an improvement in toilet behaviour (in terms of the acquisition of targets of the toilet training programme) ; and an improvement in general level of functioning (i.e. increase in P-PAC scores). The control group showed no reduction in incontinence (on any of the measures employed); and showed only a minimal improvement in general level of functioning. At this point these differences can merely be noted.

In the attempt to determine whether or not these differences were caused by the manipulation of the independent variable, the significance of some results was tested. Using the calculation of a t-test, the following differences were tested for significance:-

(i) comparison of the mean improvement in 'toilet behaviour' (as assessed on the 'toilet and washing' section of the P-PAC) in the experimental group and the control group.

(ii) comparison of the mean improvement in general level of functioning (as assessed on the total P-PAC) in the two groups.

(i) Level of toilet behaviour in the experimental and control groups:

The main measure of changes in toilet behaviour is obtained from the model of shaping of toilet behaviour. Results of this are earlier presented for the patients in the experimental group and show improvement of varying degrees in the acquisition of skills related to toilet behaviour. Being employed during the experimental phase only, this measure is not available for the control group. Comparison of levels of toilet behaviour between the two groups can, however, be made by referring to the 'toilet and washing' section of the P-PAC. There are 10 skills within this section, as shown below:-

| | | |
|---|---|---|
| 22 | Uses pot (or toilet chair) when placed on it | b |
| 41. | Bowel movements are generally regular | c |
| 61. | Has established some regularity during day time and waits a reasonable time before attended to | d |
| 62. | Indicates when wet and/or dirty | d |
| 80. | Bladder control during day, but has to go quite often | e |
| 81. | "Toilet trained" with occasional accidents | e |
| 110. | Asks to go to the toilet or goes by himself | f |
| 111. | Climbs on lavatory seat | f |
| 112. | Attends to toilet needs without help except for wiping | f |
| 113. | Dries hands adequately without much assistance | f |

Table 66 shows the scores of the patients in the experimental group (E I) and control group (C I) at the pre- and post-experimental assessments. It is seen that, apart from one patient in each group (P 36 in E I; P 35 in C I), all of the scores are obtained by patients in pairs 1 - 5, i.e. those "being potty trained". The total score of the experimental group at the pre-experimental assessment is 8 and that of the control group is 12. The experimental group obtains a

Table 66 Scores of experimental groups (E I) and control group (C I) on the 'toilet and washing' section of P-PAC at pre- and post-experimental assessments.

| | Experimental Group (E I) | | | | Control Group (C I) | | | |
|---|---|---|---|---|---|---|---|---|
| Pair | Code | Pre-Exp score | Post-Exp score | Gain/Loss | Code | Pre-Exp score | Post-Exp score | Gain/Loss |
| 1 | 53 | 3 | 7 | 4 | 51 | 1 | 1 | 0 |
| 2 | 40 | 1 | 6 | 5 | 31 | 2 | 4 | 2 |
| 3 | 49 | 1 | 7 | 6 | 32 | 3 | 5 | 2 |
| 4 | 01 | 1 | 6 | 5 | 15 | 1 | 3 | 2 |
| 5 | 05 | 1 | 6 | 5 | 30 | 4 | 5 | 1 |
| 5 | 26 | 0 | 5 | 5 | 25 | 0 | 0 | 0 |
| 7 | 22 | 0 | 5 | 5 | 17 | 0 | 0 | 0 |
| 8 | 19 | 0 | 5 | 5 | 16 | 0 | 0 | 0 |
| 9 | 18 | 0 | 5 | 5 | 42 | 0 | 0 | 0 |
| 10 | 28 | 0 | 7 | 7 | 39 | 0 | 0 | 0 |
| 11 | 04 | 0 | 5 | 5 | 21 | 0 | 0 | 0 |
| 12 | 10 | 0 | 6 | 6 | 38 | 0 | 0 | 0 |
| 13 | 48 | 0 | 5 | 5 | 14 | 0 | 0 | 0 |
| 14 | 45 | 0 | 6 | 6 | 08 | 0 | 0 | 0 |
| 15 | 36 | 1 | 2 | 1 | 35 | 1 | 0 | -1 |
| 16 | 44 | 0 | 1 | 1 | 29 | 0 | 0 | 0 |
| 17 | 27 | 0 | 1 | 1 | 11 | 0 | 0 | 0 |
| 18 | 02 | 0 | 2 | 2 | 07 | 0 | 0 | 0 |
| | | 8 | 87 | 79 | | 12 | 18 | 6 |

Table 67 : Calculation of t-test on the difference between the mean improvement of the experimental and control groups during Experiment I on the 'toilet and washing' section of the P-PAC.

| GROUP | n | Mean improvement (%) * | Standard Deviation | Standard Error | DIFFERENCE Mean | DIFFERENCE S.D. | DIFFERENCE S.E. | Correlation | 2-tail prob. | T value | degrees of freedom | 2-tail prob. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXPERIMENTAL | 18 | 41.1111 | 19.063 | 4.493 | 37.778 | 17.339 | 4.087 | 0.416 | 0.086 | 9.24 | 17 | 0.000 |
| CONTROL | 18 | 3.3333 | 8.402 | 1.980 | | | | | | | | |

*calculated as proportion of possible score; not actual score.

T value = 9.24, df = 17, $p < 0.01$ (1%)

total of 87 in the post-experimental phase, this being a gain of 79. The control group obtains a total of 18 in the post-experimental phase, the gain being 6. All patients in the experimental group have a gain in score by the post-experimental phase, the range in gain being from 1 to 7. In the control group the gain in post-experimental score is attributable to patients of pairs 1 - 5 only, these patients continuing previous potty training during the experimental phase.

Table 67 provides the calculation of a t-test on the difference between the mean improvement of the two groups in the 'toilet and washing' section of the P-PAC. The mean improvement of the experimental group is 41.11%, 37.77%greater than the mean improvement of the control group. This difference is significant at the 0.1% level (T value = 9.24, df = 17, $p < 0.001$).

(ii) Improvement in the general level of functioning of the experimental and control groups:

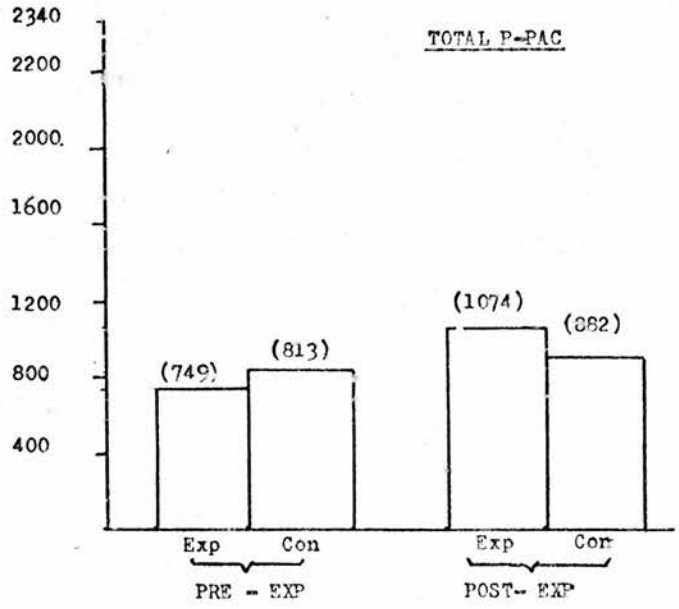
It is already shown that the experimental group demonstrates an overall improvement in the general level of functioning on the P-PAC and, that in comparison, there is minimal improvement in the control group. Table 68 shows the scores of the two groups on the total P-PAC and its four quadrants at the pre- and post-experimental assessments. There is improvement in both groups on all four quadrants. The total score of the experimental group increases from 749 to 1074; and that of the control group from 813 to 882. Graphic presentation of these results is shown by histograms in Figure 33.

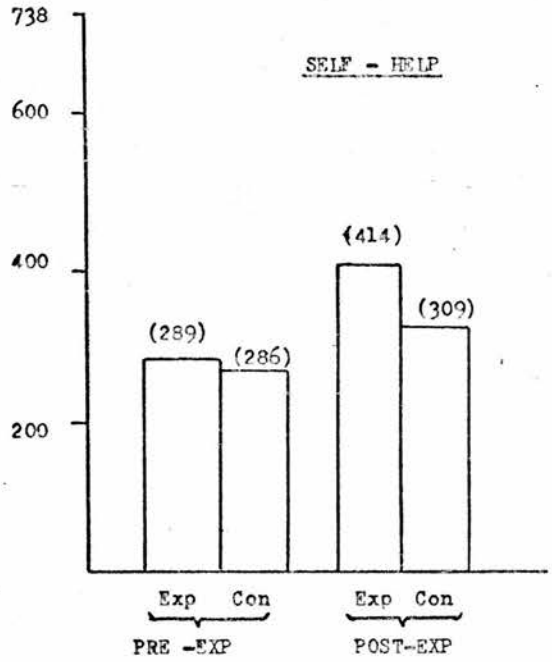
Table 69.1. shows the calculation of a t-test on the difference between the mean improvement of the two groups in terms of overall general level of function (i.e. total P-PAC). The mean improvement of the experimental group is 13.8333%, this being 10 .9444% greater

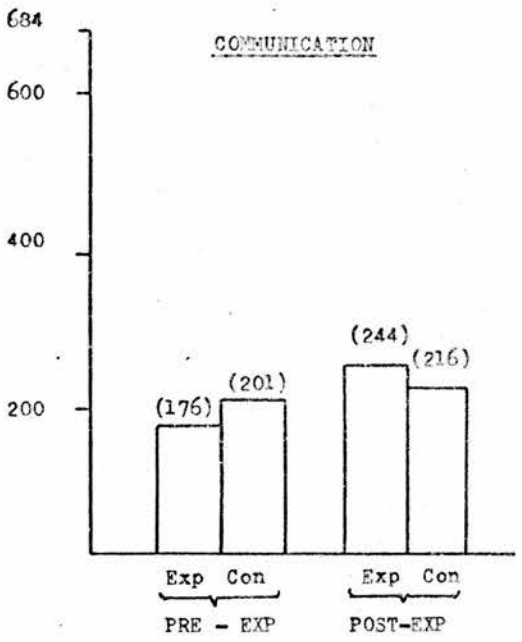
Table 68: Scores of the experimental group (E I) and the control group (C I) at the pre- and post-experimental phases on the total P-PAC and its four quadrants.

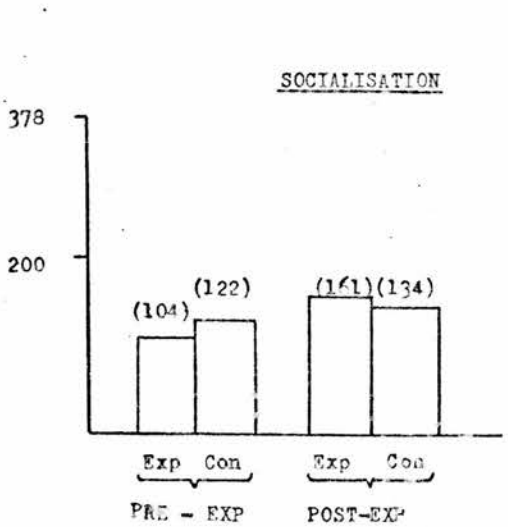
| | Experimental Group | | Control Group | |
|---|---|---|---|---|
| | Pre-Exp. | Post Exp. | Pre-Exp. | Post- Exp. |
| 'self-help' | 289 | 414 | 286 | 309 |
| 'communication' | 176 | 244 | 201 | 216 |
| 'socialisation' | 104 | 161 | 122 | 134 |
| 'occupation' | 180 | 255 | 204 | 223 |
| TOTAL P-PAC | 749 | 1074 | 813 | 882 |

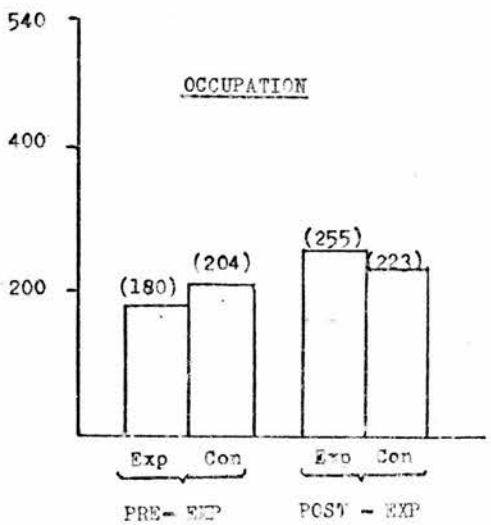
Figure 33 : Histograms showing the pre- and post-experimental scores of the experimental group (EI) and the control group (CI) on the total P-PAC and its four quadrants.



than that of the control group. The difference is highly significant at the 0.1% level ( T value = 8.84, of = 17, $p<0.001$).

If the premise is accepted that the research design fulfilled all conditions required by the method of the controlled experiment, then this result implies that the significant improvement in general level of functioning of the experimental group is brought about by the manipulation of the independent variable (i.e. the behaviour modification toilet training programme). That is, one direct effect of the experimental influence is a substantial improvement, not only in relation to the specific behaviour (toilet behaviour) being modified, but also in relation to all aspects of behaviour (general level of functioning). While it might be accepted that a greater improvement could be expected in the experimental group, the degree of difference and the level of significance of this difference is substantial. This result causes a shortcoming of the research design to be identified. Because a baseline was not obtained of the improvement over a similar period in the general level of functioning of the patients in the research sample prior to the introduction of the study, comparison cannot be made between the research results and such 'normal' results. It cannot therefore be concluded whether the improvement of the experimental group is, in fact, 'substantial' or that of the control group 'minimal'. Further analysis of the P-PAC data in inter-group comparison therefore adopts an assumption that the improvement shown in the control group is 'normal' (i.e. that expected under normal conditions), and that in the exp. group is 'greater than normal'.

Having shown the difference between the mean overall improvement of the experimental and control groups to be highly significant, further analysis requires to identify whether this result pertains also to specific areas and levels of behaviour. Tables 69.1. - 6. show

comparisons of the improvements of the two groups on the levels of the P-PAC (levels a - f); the quadrants of the P-PAC ('self-help', 'communication', 'socialisation' and 'occupation'); and the sections of these quadrants. The test of significance is done by means of a t-test on the difference between the mean score of the two groups on each variable as above.

On all 19 variables except one('eating' section; see Table 69.4) the difference between the mean scores is statistically significant. On these 18 variables, the level of significance is at 1% ($p<0.01$) on all but two('level a' and 'level e': see Table 69.2), when it is significant at 5% ($p<0.05$). In the majority of cases (levels b,c, d and f;; 'self-help', 'socialisation' and 'occupation' quadrants; 'toilet and washing', 'communication to' and 'dexterity' sections; and the total P-PAC) the significance is at the 0.01% level ( $p<$ 0.001). Thus, it is concluded that the difference between the mean improvement of the experimental and control groups is significant in relation to general level of functioning and, in addition, to all levels of behaviour and all main areas of behaviour (i.e. self-help, communication, socialisation and occupation), and all specific types of behaviours within these areas (with the exception of 'eating').

Comparison of the mean improvement among variables, shows that the greatest improvement is made by the experimental group in the 'toilet and washing' section of the P-PAC, with a mean improvement of 41.1111%. The least improvement is made on level f (4.2222%). Other variables showing a mean improvement greater than the mean improvement overall (13.8333%) are levels b and c (23.444%), level d (20.8333%), 'self-help' quadrant (16.7778%,) level e (15.5556%), 'dexterity' section (14.9444%), 'dressing' section (14.7222%),

'communication to' section (14.5556%), and 'socialisation' quadrant (14.3889%).

In the control group, the greatest improvements are made in level c (6.3889%), level e (5.0000%), and 'agility' section (4.8333%). The lowest improvements, of less than 1% significance are in levels a and f. The mean improvement overall is 2.8889%.

The greatest mean difference (37.7778 ) between the two groups occurs in the 'toilet and washing' section and the smallest in levels a and f (4.8889 and 3.5556 ), and the 'eating' and 'communication from' sections (4.7778 and 5.2778 ).

Thus, while the differences between the mean improvements of the two groups are significant in relation to all variables, except 'eating', examination of the mean and mean difference shows clearly that the 'toilet and washing' section is exceptional in terms of the magnitude of mean improvement and mean difference.

Comparisons of the experimental and control groups in relation to (i) toilet behaviour and (ii) general level of functioning yielded highly significant results and suggest a causal relationship between the independent variable of the experiment and its effects on these two dependent variables.

Further statistical analysis was not undertaken and Tables 70 - 74 contain presentation of comparable data pertaining to the experimental and control groups. Post-experimental differences between the experimental and control groups are evident in these various data.

Table 69.1 : Calculation of t-test on the difference between the mean improvement of experimental group I (EI) and the control group (CI) of overall level of functioning as on the TOTAL P-PAC: during Experiment I.

| GROUP | n | Mean improvement | Standard Deviation | Standard Error | DIFFERENCE | | | Correl-ation | 2-tail prob. | T value | degrees of freedom | 2-tail prob. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mean | S.D. | S.E. | | | | | |
| EXPERIMENTAL | 18 | 13.8333 | 5.854 | 1.380 | 10.9444 | 5.252 | 1.238 | 0.471 | 0.048 | 8.84 | 17 | 0.000 |
| CONTROL | 18 | 2.8889 | 3.724 | 0.878 | | | | | | | | |

T value = 8.84, df = 17, $p < 0.01$ (1%)

Table 69. 2 .: Comparisons of the improvements in general level of functioning of the experimental group (EI) and the control group (CI) during Experiment I on LEVELS (a-f) of the P-PAC by calculation of t-tests on the difference between the mean improvement of the two groups.

| P-PAC | GROUP | n | Mean improvement | Standard Deviation | Standard Error | DIFFERENCE Mean | DIFFERENCE S.D. | DIFFERENCE S.E. | Corr-elation | 2-tail prob. | T value | df | 2tail prob. | SIGNIFICANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| level a | EXP | 18 | 5.2778 | 7.242 | 1.707 | 4.8889 | 8.331 | 1.964 | -0.334 | 0.175 | 2.49 | 17 | 0.023 | T value=2.49, df = 17, p < 0.05 |
| | CON | 18 | 0.3889 | 2.355 | 0.555 | | | | | | | | | |
| level b | EXP | 18 | 23.4444 | 13.290 | 3.132 | 21.0555 | 12.927 | 3.047 | 0.254 | 0.310 | 6.91 | 17 | 0.000 | T value=6.91, df = 17, p < 0.01 |
| | CON | 18 | 2.3889 | 4.742 | 1.118 | | | | | | | | | |
| level c | EXP | 18 | 23.4444 | 13.747 | 3.240 | 17.0555 | 14.252 | 3.359 | 0.279 | 0.262 | 5.08 | 17 | 0.000 | T value=5.08, df = 17, p < 0.01 |
| | CON | 18 | 6.3889 | 9.211 | 2.171 | | | | | | | | | |
| level d | EXP | 18 | 20.8333 | 13.531 | 3.189 | 16.1111 | 10.081 | 2.376 | 0.677 | 0.002 | 6.78 | 17 | 0.000 | T value=6.78, df = 17, p < 0.01 |
| | CON | 18 | 4.7222 | 7.568 | 1.784 | | | | | | | | | |
| level e | EXP | 18 | 15.5556 | 13.600 | 3.206 | 10.5556 | 14.642 | 3.451 | 0.180 | 0.474 | 3.06 | 17 | 0.007 | T value=3.06, df = 17, p < 0.05 |
| | CON | 18 | 5.000 | 8.402 | 1.980 | | | | | | | | | |
| level f | EXP | 18 | 4.2222 | 4.440 | 1.046 | 3.5556 | 3.854 | 0.908 | 0.530 | 0.024 | 3.91 | 17 | 0.001 | T value=3.91, df = 17, p < 0.01 |
| | CON | 18 | 0.667 | 1.534 | 0.362 | | | | | | | | | |

Table 69.3 : Calculation of t-test on the difference between the mean improvement of the experimental group (EI) and the control group (CI) on the SELF-HELP QUADRANT of the P-PAC during Experiment I.

| GROUP | n | Mean improvement | Standard Deviation | Standard Error | DIFFERENCE Mean | DIFFERENCE S.D. | DIFFERENCE S.E. | Correlation | 2-tail prob. | t value | degrees of freedom | 2-tail prob. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXPERIMENTAL | 18 | 16.7778 | 7.000 | 1.650 | 13.7778 | 5.735 | 1.352 | 0.578 | 0.012 | 10.19 | 17 | 0.000 |
| CONTROL | 18 | 3.0000 | 3.548 | 0.836 | | | | | | | | |

T value = 10.19, df = 17, $p < 0.01$ (1%)

Table 69.4. : Calculation of t-tests on the difference between the mean improvement of the experimental group (EI) and the control group (CI) on SECTIONS in SELF-HELP QUADRANT of P-PAC (sections :- eating, mobility, toilet and washing, dressing) during Experiment I.

| P-PAC | GROUP | n | Mean improvement | Standard Deviation | Standard Error | DIFFERENCE Mean | DIFFERENCE S.D. | DIFFERENCE S.E. | Corr-elation | 2-tail prob. | T value | df | 2-tail prob. | SIGNIFICANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| eating section | EXP | 18 | 8.2222 | 12.086 | 2.849 | 4.7778 | 13.641 | 3.215 | -0.154 | 0.542 | 1.49 | 17 | 0.156 | T value=1.49, df = 17, not signific. |
| | CON | 18 | 3.444 | 4.731 | 1.115 | | | | | | | | | |
| mobility section | EXP | 18 | 7.3889 | 7.994 | 1.884 | 5.1667 | 8.133 | 1.917 | 0.445 | 0.064 | 2.70 | 17 | 0.015 | T value=2.70, df = 17, p < 0.01 |
| | CON | 18 | 2.2222 | 7.425 | 1.750 | | | | | | | | | |
| toilet and washing section | EXP | 18 | 41.1111 | 19.063 | 4.493 | 37.778 | 17.339 | 4.087 | 0.416 | 0.086 | 9.24 | 17 | 0.000 | T value=9.24, df = 17, p < 0.01 |
| | CON | 18 | 3.3333 | 8.402 | 1.980 | | | | | | | | | |
| dressing section | EXP | 18 | 14.7222 | 14.863 | 3.503 | 11.9444 | 15.884 | 3.744 | 0.362 | 0.140 | 3.19 | 17 | 0.005 | T value=3.19, df = 17, p < 0.01 |
| | CON | 18 | 2.7778 | 13.149 | 3.099 | | | | | | | | | |

Table 69.5 : Calculation of t-tests on the difference between the mean improvement of the experimental group (EI) and the control group (CI) on the COMMUNICATION QUADRANT and SECTIONS in it during Experiment I.

| P-PAC | GROUP | n | Mean improvement | Standard Deviation | Standard Error | DIFFERENCE Mean | DIFFERENCE S.D. | DIFFERENCE S.E. | Correlation | 2-tail prob. | T value | df | 2-tail prob. | SIGNIFICANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| comm. quadrant | EXP | 18 | 10.2222 | 5.673 | 1.337 | 8.0000 | 4.678 | 1.103 | 0.578 | 0.012 | 7.26 | 17 | 0.000 | T value=7.26, df = 17, $p < 0.01$ |
| | CON | 18 | 2.2222 | 3.949 | 0.931 | | | | | | | | | |
| comm. from section | EXP | 18 | 6.6667 | 7.071 | 1.667 | 5.2778 | 6.524 | 1.538 | 0.386 | 0.113 | 3.43 | 17 | 0.003 | T value=3.43, df = 17, $p < 0.01$ |
| | CON | 18 | 1.3889 | 2.873 | 0.667 | | | | | | | | | |
| comm. to section | EXP | 18 | 14.5556 | 8.847 | 2.085 | 11.1111 | 10.731 | 2.529 | 0.138 | 0.586 | 4.39 | 17 | 0.000 | T value=4.39, df = 17, $p < 0.01$ |
| | CON | 18 | 3.4444 | 7.414 | 1.747 | | | | | | | | | |

Table 69.6. : Calculation of t-tests on the difference between the mean improvement of the experimental group (EI) and the control group (CI) during Experiment I on the SOCIALISATION and COMMUNICATION QUADRANTS (and sections) of the P-PAC.

| P-PAC | GROUP | n | Mean improvement | Standard Deviation | Standard Error | DIFFERENCE Mean | DIFFERENCE S.D. | DIFFERENCE S.E. | Correlation | 2-tail prob. | T value | df | 2-tail prob. | SIGNIFICANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| social. quadrant | EXP | 18 | 14.3889 | 10.256 | 2.417 | 11.3333 | 11.647 | 2.745 | - 0.108 | 0.669 | 4.13 | 17 | 0.001 | T value=4.13, df = 17, p < 0.01 |
| | CON | 18 | 3.0556 | 4.518 | 1.065 | | | | | | | | | |
| occup. section | EXP | 18 | 13.8889 | 9.267 | 2.184 | 10.3333 | 8.964 | 2.113 | 0.403 | 0.097 | 4.89 | 17 | 0.000 | T value=4.89, df = 17, p < 0.01 |
| | CON | 18 | 3.5556 | 6.444 | 1.566 | | | | | | | | | |
| dexter. section | EXP | 18 | 14.0444 | 9.434 | 2.224 | 12.8889 | 11.156 | 2.630 | 0.096 | 0.704 | 4.90 | 17 | 0.000 | T value=4.90, df = 17, p < 0.01 |
| | CON | 18 | 2.0556 | 6.932 | 1.634 | | | | | | | | | |
| agility section | EXP | 18 | 13.2222 | 11.993 | 2.827 | 8.3889 | 13.030 | 3.071 | 0.243 | 0.331 | 2.73 | 17 | 0.014 | T value=2.73, df = 17, p < 0.01 |
| | CON | | 4.8333 | 8.787 | 2.071 | | | | | | | | | |

Table 70 : Frequencies of elimination responses in the experimental group (E I) and control group (C I), at the pre- and post-experimental phases of Experiment I.

| | Pre- Experimental | | | Post-Experimental | | |
|---|---|---|---|---|---|---|
| | All elim-inations | Incontin. elimin$^{s}$. | Elimin$^{s}$. in toilet. | All elimin$^{s}$. | Incontin. elimin$^{s}$ | Elimin$^{s}$ in toilet |
| Experim-ental group | 3074 | 2351 | 723 | 4796 | 1238 | 3558 |
| Control group | 3134 | 2279 | 855 | 3523 | 2647 | 876 |

Table 71: Proportions of incontinent eliminations and eliminations in the toilet for the experimental group (E I) and control group (C I)

| | Pre-Experimental | | Post- Experimental | |
|---|---|---|---|---|
| | Incontinent Eliminations (%) | Eliminations in toilet (%) | Incontinent Eliminations (%) | Eliminations in toilet (%) |
| Experim-ental group | 76.48 | 23.52 | 25.81 | 74.19 |
| Control group | 72.71 | 27.28 | 75.13 | 24.86 |

Table 72 Degree of incontinence of patients in the experimental group (E I) and the control group (C I) at the pre- and post-experimental phases of Experiment I

| Degree of Incontinence (E I) | | | | (C I) Degree of Incontinence | | |
|---|---|---|---|---|---|---|
| Pair | Code | Pre-Exp. | Post-Exp. | Code | Pre-Exp | Post-Exp. |
| 1 | 53 | 25 | 2 | 51 | 37 | 51 |
| 2 | 40 | 33 | 7 | 31 | 32 | 37 |
| 3 | 49 | 28 | 10 | 32 | 19 | 32 |
| 4 | 01 | 60 | 13 | 15 | 49 | 39 |
| 5 | 05 | 61 | 21 | 30 | 23 | 31 |
| 6 | 26 | 98 | 12 | 25 | 98 | 100 |
| 7 | 22 | 96 | 8 | 17 | 100 | 100 |
| 8 | 19 | 97 | 15 | 16 | 97 | 100 |
| 9 | 18 | 95 | 8 | 42 | 99 | 100 |
| 10 | 28 | 97 | 8 | 39 | 99 | 100 |
| 11 | 04 | 99 | 18 | 21 | 98 | 100 |
| 12 | 10 | 97 | 25 | 38 | 97 | 100 |
| 13 | 48 | 96 | 28 | 14 | 98 | 100 |
| 14 | 45 | 98 | 27 | 08 | 99 | 100 |
| 15 | 36 | 97 | 100 | 35 | 97 | 100 |
| 16 | 44 | 98 | 93 | 29 | 98 | 100 |
| 17 | 27 | 97 | 99 | 11 | 97 | 100 |
| 18 | 02 | 100 | 98 | 07 | 98 | 100 |

Table 73: Numbers of patients maintained in nappies in the experimental group (E I) and control group (C I) at the pre- and post-experimental assessments.

| | Pre - Experimental | | Post - Experimental | |
|---|---|---|---|---|
| | n | % | n | % |
| Experimental Group | 13 | 72.22 | 4 | 22.22 |
| Control Group | 13 | 72.22 | 13 | 72.22 |

Table 74: Prevalence of total incontinence in the experimental group (E I) and the control group (C I) at the pre- and post- experimental phases.

| | Pre - Experimental | | Post - Experimental | |
|---|---|---|---|---|
| | n | % | n | % |
| Experimental Group | 13 | 72.22 | 4 | 22.22 |
| Control Group | 13 | 72.22 | 13 | 72.22 |

CHAPTER 10:

RESULTS (II) - Results of Experiment II

1. Results pertaining to the experimental group (E II):-
   (i) Reduction in incontinence.
   (ii) Improvement in toilet behaviour.
   (iii) Improvement in general level of functioning.

2. Comparison of results of Experiments I and II.

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1. Results pertaining to the experimental group (E II):-

(i) Reduction in incontinence:

Data gained from the recording of elimination response rates in the pre-and post-experimental phases of Experiment II for the experimental group (E II) are provided in Appendix 2. Data are shown for each patient on the 30 days' recording of the pre-experimental phase and the 10 days' recording of the post-experimental phase. (Where direct comparison between the two phases is made in terms of response frequency, the post-experimental data are multiplied by 3 to provide data as for 30 days). Tables 75 - 81 are derived from these data.

Comparison of the total number of elimination responses in each phase for the experimental group (E II) is shown in Table 75. The total number of elimination responses in the pre-experimental phase is 3376 and in the post-experimental phase is 4518. This comprises an increase in the number of eliminations in the toilet of 2364 (from 876 to 3240) and a decrease in the number of incontinent eliminations of 1222 (from 2500 to 1278). (The actual numbers of responses recorded in the 10-day post-experimental phases are

shown in the table). The percentage of all eliminations which is incontinent eliminations is 74.05% in the pre-experimental phase, and 28.29% in the post-experimental phase. Eliminations in the toilet account for 25.95% of all eliminations in the pre-experimental phase and for 71.71% in the post-experimental phase (see Table 76).

Table 77 shows the changes in frequency in terms of the mean number of responses per day. The mean number of all elimination responses increases from 112.53 per day in the pre-experimental phase to 150.60 in the post-experimental phase. The mean number of eliminations in the toilet in the pre-experimental phase is 29.20 and in the post-experimental phase is 108.00. The mean number of incontinent eliminations is 83.33 per day in the pre-experimental phase and, at 42.60 in the post-experimental phase, is almost exactly halved.

The total number of elimination responses (all eliminations, incontinent eliminations and eliminations in the toilet) for each patient in the experimental group during the pre-experimental and post-experimental phases (both calculated as for 30 days) are provided in Table 78. The mean number per day for each patient is shown in Table 79. It is seen that 5 patients (Ps 51, 31, 32, 15 and 30), those previously "potty trained", between them account for all the eliminations in the toilet at the pre-experimental phase. The mean number per patient per day ranges from 4.3 - 6.4 The remaining 12 patients, those totally incontinent, show mean numbers of incontinent eliminations per day ranging from 4.9 - 5.9 in the pre-experimental phase.

At the post-experimental phase, 2 patients (Ps 17 and 16) remain totally incontinent, their mean numbers of incontinent eliminations remaining similar to those at the pre-experimental phase. 1 patient (P 29), previously incontinent, has 9 eliminations in the toilet at the post-experimental phase (mean of 0.3 per day) and an increase in the

number of incontinent eliminations from 176 (mean of 5.9 per day) to 216 (mean of 7.2 per day). Another patient (P 33) shows similarly minimal changes. The number of incontinent eliminations is 155 in the pre-experimental phase (mean of 5.2 per day) and 216 in the post-experimental phase (mean of 8.1). There are a total of 27 (mean of 0.9 per day) eliminations in the toilet. These 4 patients are grouped together as being incontinent in the pre-experimental phase and remaining so after the experimental phase.

The other 13 patients show an increase in the number of eliminations in the toilet (and mean number per day) and a decrease in the number of incontinent eliminations (and mean number per day) by the post-experimental phase. In the pre-experimental phase the mean number of incontinent eliminations per day ranges from 2.8 - 5.9 and, in the post-experimental phase, from 0.0 - 2.8. In the post-experimental phase, the mean number of eliminations in the toilet per day ranges from 7.2 - 10.0, compared with 4.3 - 6.4 in the pre-experimental phase. Of these 13 patients, all 8 (Ps 35, 39, 21, 25, 42, 14, 08, 07) who were totally incontinent in the pre-experimental phase show a fairly large increase in the total number of eliminations per day to a mean number per day which falls within the range of 8.7 - 10.5. Those 5 patients (Ps 51, 31, 32, 15, 30) showing higher frequencies of all elimination responses, and greater numbers of eliminations in the toilet than incontinent eliminations in the pre-experimental phase, all reduce their mean number of incontinent eliminations per day to less than 1.0 (range: 0.0 - 0.7). There is very little difference between the pre- and post-experimental mean numbers of all eliminations responses in this group of 5 patients.

Table 80 shows the patients in the experimental group (E II) by degree of incontinence at the pre- and post-experimental assessments. In the pre-experimental phase, the 5 patients previously being potty

trained" have degrees of incontinence between 31% and 51%. The remaining 12 patients are all 100% incontinent. The first group (Ps 51, 31, 32, 15, 30) all show a reduction to less than 10%, the percentage reductions ranging from 28% to 45%. Of the other 8 patients (Ps 35, 39, 21, 25, 42, 14, 08, 07) who show a substantial reduction in degree of incontinence, the degrees at the post-experimental phase range from 12% to 28%. The reductions therefore amount to between 72% and 88%.

The changes in the distribution of the experimental group by degree of incontinence are shown numerically in a frequency distribution (Table 81) and graphically in histograms (Figure 34).

A summary of the effect of Experiment II upon the prevalence of total incontinence in the experimental group (E II) is provided in Tables 82 and 83. The prevalence of total incontinence is reduced from 70.59% (n = 12) in the pre-experimental phase to 17.64% (n = 3) in the post-experimental phase. The number of patients maintained in nappies is reduced from 12 (70.59%) to 4 (23.52%). The discrepancy between these two measures arises in relation to P 33. He continues to be maintained in nappies at the post-experimental phase, but is just excluded from the category of 'totally incontinent' (90 - 100% degree), his degree of incontinence post-experimentally being 89%.

A reduction in incontinence in the experimental group (E II) is therefore shown be reduction in the frequency of incontinent eliminations, reduction in the mean number of incontinent eliminations per day, a change in the distribution of patients in the group by degree of incontinence, reduced degrees of incontinence in 15 patients (substantial in 13), a reduction in the prevalence of total incontinence and in the number of patients maintained in nappies.

Table 75: Comparison of total number of elimination responses (all eliminations, incontinent eliminations and eliminations in toilet) in the experimental group (E II) at the pre- and post-experimental phases of Experiment II

| Elimination Responses | Pre-Exp. | Post Exp. | |
|---|---|---|---|
| | (30 days) | (10 days) | (30 days) |
| Number of incontinent eliminations | 2500 | (426) | 1278 |
| No. of eliminations in toilet | 876 | (1080) | 3240 |
| Total number eliminations | 3376 | (1506) | 4518 |

Table 76: Percentage of all eliminations of incontinent eliminations and eliminations in toilet for experimental group (E II) before and after Experiment II

| Elimination responses | Pre-Exp | | Post-Exp | |
|---|---|---|---|---|
| | N | % | N | % |
| All elimination responses | 3376 | 100 | 4518 | 100 |
| Incontinent eliminations | 2500 | 74.05 | 1278 | 28.29 |
| Eliminations in toilet | 876 | 25.95 | 3240 | 71.71 |

Table 77: Mean number of elimination responses per day in the the experimental group (E II) during the pre- and post-experimental phases of Experiment II.

| Elimination Responses | Number | | Mean per day | |
|---|---|---|---|---|
| | Pre-Exp. | Post Exp. | Pre-Exp. | Post-Exp. |
| | (30 days) | (10 days) | | |
| All elimination responses | 3376 | 1506 | 112.53 | 150.60 |
| Incontinent eliminations | 2500 | 426 | 83.33 | 42.60 |
| Eliminations in toilet | 876 | 1080 | 29.20 | 108.00 |

Table 78: Total number of elimination responses of the patients (n=17) in the experimental group (EII) in the pre- and post-experimental phases of Experiment II. (calculated as 30 days in each phase)

| Patient code | ALL ELIMINATIONS Pre-exp. | ALL ELIMINATIONS Post-exp. | INCONTINENT ELIMINATIONS Pre-exp. | INCONTINENT ELIMINATIONS Post-exp. | ELIMINATIONS IN TOILET Pre-exp. | ELIMINATIONS IN TOILET Post-exp. |
|---|---|---|---|---|---|---|
| 51 | 249 | 255 | 128 | 15 | 121 | 240 |
| 31 | 304 | 321 | 111 | 21 | 193 | 300 |
| 32 | 283 | 267 | 91 | 12 | 192 | 255 |
| 15 | 304 | 306 | 120 | 21 | 184 | 285 |
| 30 | 269 | 267 | 83 | 0 | 186 | 267 |
| 35 | 162 | 267 | 162 | 33 | 0 | 234 |
| 39 | 149 | 315 | 149 | 78 | 0 | 237 |
| 21 | 169 | 276 | 169 | 39 | 0 | 237 |
| 25 | 163 | 306 | 163 | 54 | 0 | 252 |
| 42 | 174 | 303 | 174 | 84 | 0 | 219 |
| 14 | 174 | 300 | 174 | 63 | 0 | 237 |
| 08 | 146 | 270 | 146 | 54 | 0 | 216 |
| 07 | 170 | 261 | 170 | 36 | 0 | 225 |
| 17 | 166 | 162 | 166 | 162 | 0 | 0 |
| 16 | 163 | 174 | 163 | 174 | 0 | 0 |
| 29 | 176 | 225 | 176 | 216 | 0 | 9 |
| 33 | 155 | 243 | 155 | 216 | 0 | 27 |
| N=17 | 3376 | 4518 | 2500 | 1278 | 876 | 3240 |

Table 79 : Mean number of elimination responses per patient per day in the experimental group (EII) at pre- and post-experimental phases of Experiment II.

| Patient code | No. of days' recording | | MEAN NO. RESPONSES PER DAY | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | All elimination responses | | Incontinent eliminations | | Eliminations in toilet | |
| | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. | Pre-exp. | Post-exp. |
| 51 | 28 | 9 | 8·9 | 9·4 | 4·6 | 0·5 | 4·3 | 8·9 |
| 31 | 30 | 10 | 10·1 | 10·7 | 3·7 | 0·7 | 6·4 | 10·0 |
| 32 | 30 | 10 | 9·4 | 8·9 | 3·3 | 0·4 | 6·4 | 8·5 |
| 15 | 30 | 10 | 10·1 | 10·2 | 4·0 | 0·7 | 6·1 | 9·5 |
| 30 | 30 | 10 | 8·9 | 8·9 | 2·8 | 0·0 | 6·2 | 8·9 |
| 35 | 30 | 10 | 5·4 | 8·9 | 5·4 | 1·1 | 0·0 | 7·8 |
| 39 | 30 | 10 | 4·9 | 10·5 | 4·9 | 2·6 | 0·0 | 7·9 |
| 21 | 30 | 10 | 5·6 | 9·2 | 5·6 | 1·3 | 0·0 | 7·9 |
| 25 | 30 | 10 | 5·4 | 10·2 | 5·4 | 1·8 | 0·0 | 8·4 |
| 42 | 30 | 10 | 5·8 | 10·1 | 5·8 | 2·8 | 0·0 | 7·3 |
| 14 | 30 | 10 | 5·8 | 10·0 | 5·8 | 2·1 | 0·0 | 7·9 |
| 08 | 30 | 10 | 4·9 | 9·0 | 4·9 | 1·8 | 0·0 | 7·2 |
| 07 | 30 | 10 | 5·7 | 8·7 | 5·7 | 1·2 | 0·0 | 7·5 |
| 17 | 30 | 10 | 5·5 | 5·4 | 5·5 | 5·4 | 0·0 | 0·0 |
| 16 | 30 | 10 | 5·4 | 5·8 | 5·4 | 5·8 | 0·0 | 0·0 |
| 29 | 30 | 10 | 5·9 | 7·5 | 5·9 | 7·2 | 0·0 | 0·3 |
| 33 | 30 | 10 | 5·2 | 8·1 | 5·2 | 7·2 | 0·0 | 0·9 |

Table 80: Degree of incontinence of patients in the experimental group (E II) before and after Experiment II

| Patients' Code | Degree of incontinence (%) Pre-Exp. | Post-Exp. | Difference (%) |
|---|---|---|---|
| 51 | 51 | 6 | -45 |
| 31 | 37 | 7 | -30 |
| 32 | 32 | 4 | -28 |
| 15 | 39 | 7 | -32 |
| 30 | 31 | 0 | -31 |
| 35 | 100 | 12 | -88 |
| 39 | 100 | 25 | -75 |
| 21 | 100 | 14 | -86 |
| 25 | 100 | 18 | -82 |
| 42 | 100 | 28 | -72 |
| 14 | 100 | 21 | -79 |
| 08 | 100 | 20 | -80 |
| 07 | 100 | 14 | -86 |
| 17 | 100 | 100 | 0 |
| 16 | 100 | 100 | 0 |
| 29 | 100 | 96 | -4 |
| 33 | 100 | 89 | -11 |

Table 81: Distribution of patients in the experimental group (E II) by percentile degree of incontinence at the pre- and post-experimental phases of Experiment II

| Percentile Degree of Incontinence | Number of patients | |
|---|---|---|
| | Pre-Exp. | Post-Exp. |
| 90 - 100% | 12 | 3 |
| 80 - 89% | 0 | 1 |
| 70 - 79% | 0 | 0 |
| 60 - 69% | 0 | 0 |
| 50 - 59% | 1 | 0 |
| 40 - 49% | 0 | 0 |
| 30 - 39% | 4 | 0 |
| 20 - 29% | 0 | 4 |
| 10 - 19% | 0 | 4 |
| 0 - 9% | 0 | 5 |
| | n = 17 | n = 17 |

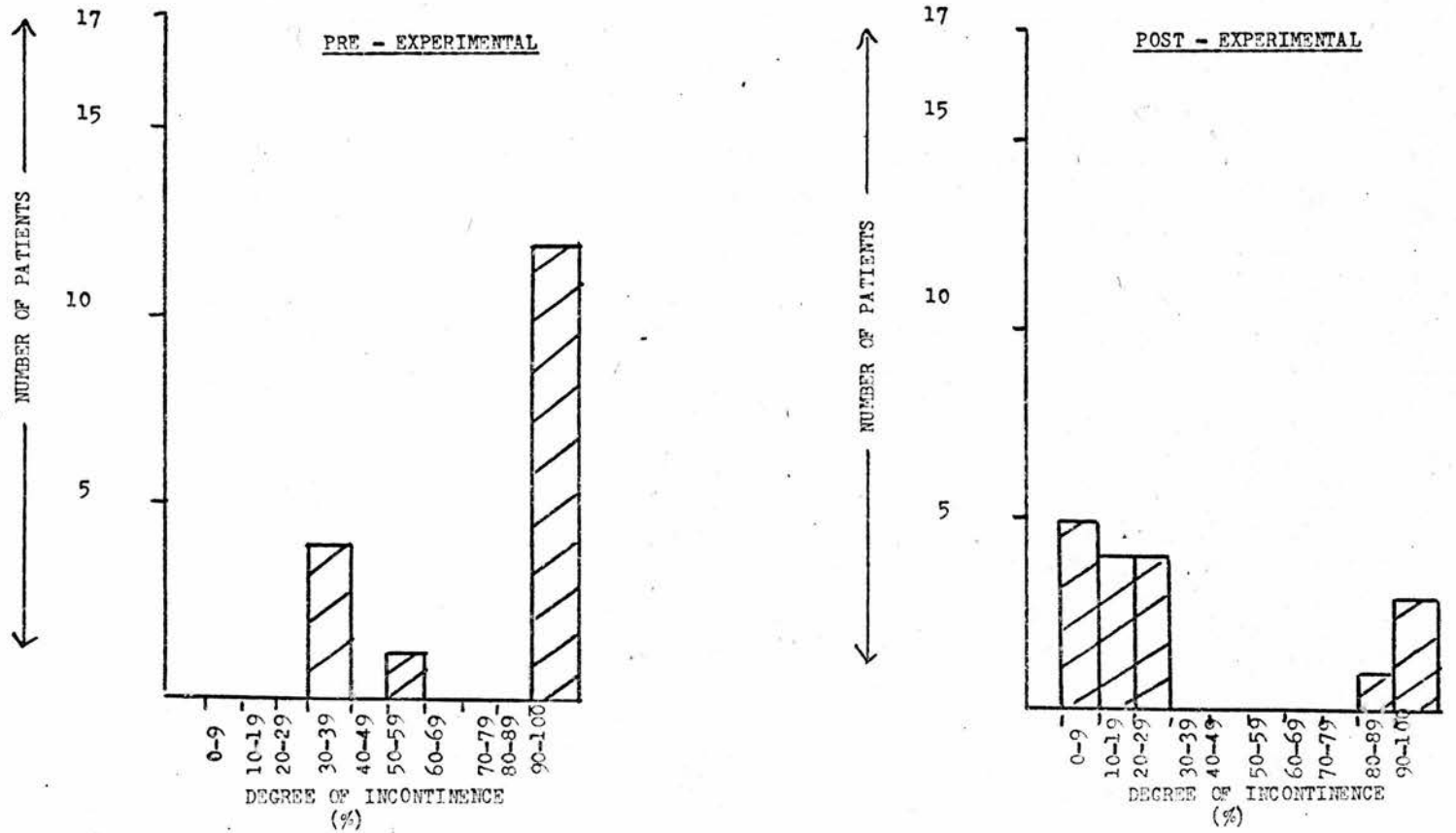


Figure 34 : Histograms showing distribution of patients in the experimental group (E II) by percentile degree of incontinence at the pre- and post-experimental phases of Experiment II.

Table 82: Prevalence of total incontinence in the experimental group (E II) before and after Experiment II.

| | Totally Incontinent | |
|---|---|---|
| | N | % |
| Pre-Experimental phase | 12 | 70.59 |
| Post-Experimental phase | 3 | 17.64 |

Table 83: Number of patients maintained in nappies in the experimental group (E II) before and after Experiment II

| | Maintained in Nappies | |
|---|---|---|
| | N | % |
| Pre-Experimental phase | 12 | 70.59 |
| Post-Experimental phase | 4 | 23.52 |

(ii) Improvement in toilet behaviour:

Results presented here are obtained from evaluation of the acquisition of target behaviours on the model of shaping toilet behaviour at the end of the experimental phase of Experiment II.

Figure 35 shows the target behaviours established at the start and the end of the experimental phase for patients in the experimental group (E II). The diagram illustrates the acquisition of target behaviours to be greater in the 'eliminating' and 'sitting' areas than in the 'dressing' and 'going' areas. 5 patients had some targets established on the model prior to the programme (Ps 51, 31, 32, 15, 30). One of these patients (P 30) established all 16 targets by the end of Experiment II and has therefore met the full final target behaviour of the behaviour modification toilet training programme. Two patients (Ps 17 and 16) have no established targets in the areas of 'eliminating', 'sitting' and 'dressing', and only one each in the area of 'going', this being the base target behaviour (target 13). Two other patients show minimal improvement in toilet behaviour. These patients (Ps 29 and 33) each establish the base target behaviour (targets 5, 9 and 13) in the areas of 'sitting', 'dressing' and 'going' with no established targets in the eliminating area.

Tables 84 - 91 contain the number of target behaviours established before and by the end of Experiment II, and the distribution of patients by the number of targets acquired, in each of the four areas of the model. In the 'eliminating' area, 9 targets are established prior to the programme and 42 targets by the end (mean of 2.47 per patient). The number of targets acquired is therefore 33 (mean of 1.94 per patient). 9 'sitting' targets are also established prior to the programme and the number established by the end increases to 47 (mean of 2.76).

The number acquired is 38, this representing a mean acquisition per patient of 2.24 targets. In the area of 'dressing', only 5 targets are established prior to the programme. 27 targets are acquired (mean of 1.59 perpatient), the number established at the end being 32 (mean of 1.88 per patient). In the 'going' area of the model, 6 targets are established before the programme, 17 are acquired (mean of 1.00) and 23 targets established by the end of the programme (mean of 1.35). These data refer to the experimental group (E II) as a whole. Data on individual patients within the group are presented in Table 92, a numerical presentation of data shown in Figure 36. Variations in the number of targets established before the programme, acquired during it and established by the end of it can be seen here. The percentage of the final target behaviour (16 targets) is shown to range from 6.3% (1 target) to 100.00% (16 targets). The distribution of patients by this cumulative measure is shown in a frequency distribution (Table 93)and in histograms (Figure 35). The mean no of target behaviours established at the end of Experiment II is 8.47, this being 52.95% of the final target behaviour.

Table 94 collects together quantitive data on the four areas of the model and the total model in relation to the group (E II) as a whole. Comparisons between areas can be made. It is in the 'sitting' area (targets 5 - 8) that there is the greatest acquisition of targets during the programme (total of 38 targets; mean of 2.24 per patient), and the highest number of targets established at the end (total of 47; mean of 2.76 per patient). Although there is one of the highest number of targets established before the programme (9 targets) in this 'sitting' area, the percentage increase over baseline is still the highest at 56.60%. Ranking second in terms of the number of targets established before (9), acquired during

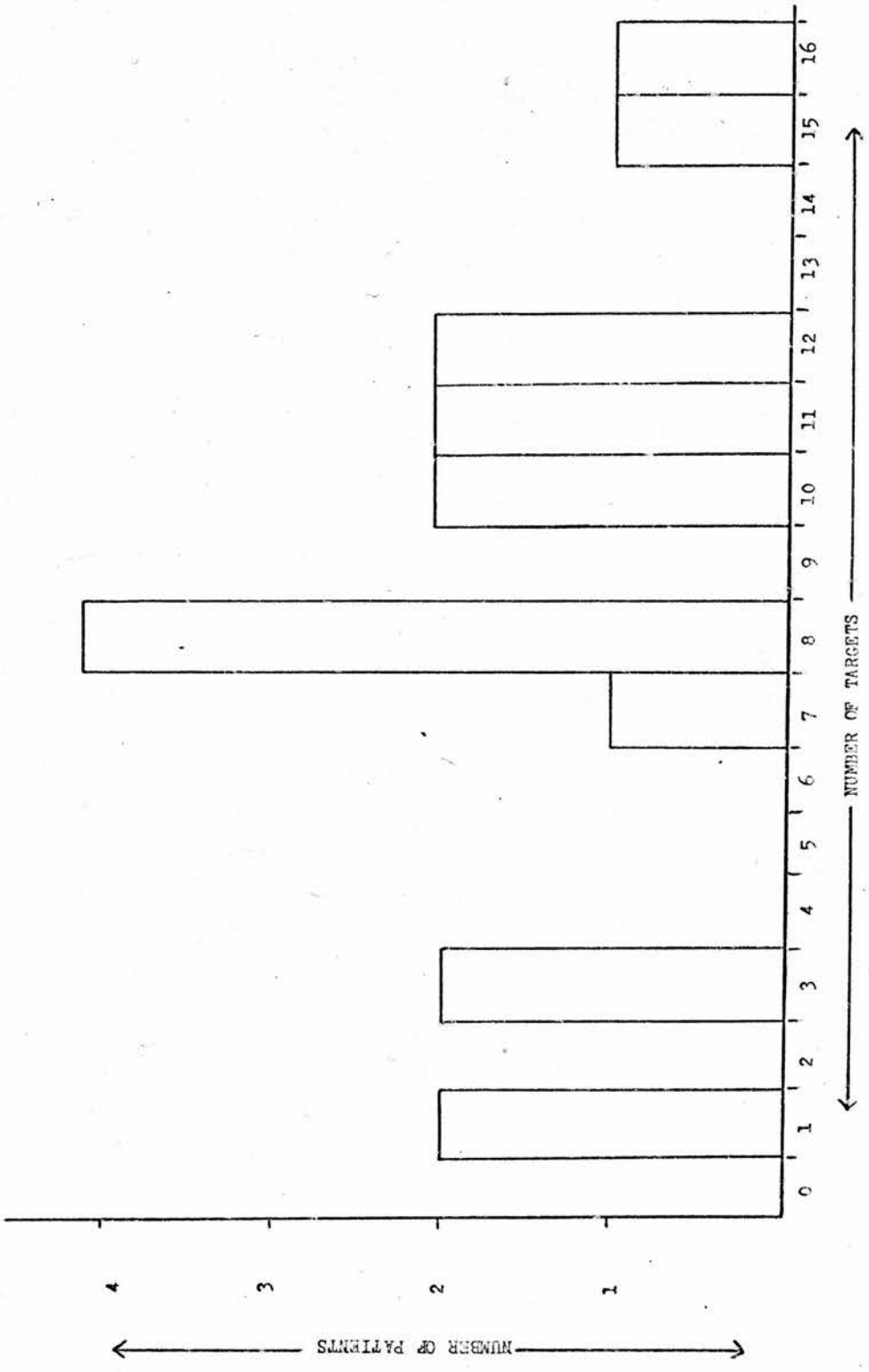


Figure 35 : Histogram of distribution of patients (E II) by number of targets (toilet behaviour) established by the end of experiment II.

Table 84: Number of target behaviours related to 'eliminating' established before and by the end of Experiment II

| Established targets | No. of patients | | No. of targets | |
|---|---|---|---|---|
| | Pre-Exp. | Post Exp | Pre-Exp. | Post-Exp. |
| 1 - 4 (incl) | 0 | 5 | 0 | 20 |
| 1 - 3 (incl) | 0 | 6 | 0 | 18 |
| 1 and 2 | 4 | 2 | 8 | 4 |
| 1 only | 1 | 0 | 1 | 0 |
| none | 12 | 4 | 0 | 0 |
| | n = 17 | n = 17 | 9 | 42 |

Mean no targets established at end = 2.47

Standard deviation = 1.50

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Table 85: Distribution of the experimental group (E II) by the number of 'eliminating' targets acquired during Experiment II

| No. of targets acquired. | No. of patients (f) | fx |
|---|---|---|
| 0 | 4 | 0 |
| 1 | 0 | 0 |
| 2 | 6 | 12 |
| 3 | 7 | 21 |
| 4 | 0 | 0 |
| | n = 17 | fx = 33 |

Mean no targets acquired = 1.94

Standard deviation = 1.16

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Table 86: Number of target behaviours related to 'sitting' established before and by the end of Experiment II.

| Established targets | No. of Patients | | No. of targets | |
|---|---|---|---|---|
| | Pre-Exp. | Post-Exp. | Pre-Exp. | Post-Exp. |
| 5 - 8 (incl) | 0 | 6 | 0 | 24 |
| 5 - 7 (incl) | 1 | 7 | 3 | 21 |
| 5 and 6 | 2 | 0 | 4 | 0 |
| 5 only | 2 | 2 | 2 | 2 |
| none | 12 | 2 | 0 | 0 |
| | n = 17 | n = 17 | 9 | 47 |

Mean no. targets established at end = 2.76

Standard deviation = 1.36

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Table 87: Distribution of the experimental group (E II) by the number of 'sitting' targets acquired during Experiment II.

| No. of targets acquired. | No. of patients (f) | (fx) |
|---|---|---|
| 0 | 2 | 0 |
| 1 | 4 | 4 |
| 2 | 1 | 2 |
| 3 | 8 | 24 |
| 4 | 2 | 8 |
| | n = 17 | 38 |

Mean no. of targets acquired = 2.24

Standard deviation = 1.26

Table 88: Number of target behaviours related to 'dressing' established before and by the end of Experiment II .

| Established targets | No. of Patients | | No. of Targets | |
|---|---|---|---|---|
| | Pre-Exp. | End of ExpII | Pre-Exp. | Post-Exp.II |
| 9 - 12 (incl) | 0 | 3 | 0 | 12 |
| 9 - 11 (incl) | 0 | 3 | 0 | 9 |
| 9 and 10 only | 1 | 2 | 2 | 4 |
| 9 only | 3 | 7 | 3 | 7 |
| none | 13 | 2 | 0 | 0 |
| | n = 17 | n = 17 | 5 | 32 |

Mean no. targets established at end = 1.88

Standard deviation = 1.32

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Table 89: Distribution of the experimental group (E II) by the number of 'dressing' targets acquired during Experiment II .

| No. of targets acquired | No. of patients (f) | (fx) |
|---|---|---|
| 0 | 2 | 0 |
| 1 | 8 | 8 |
| 2 | 3 | 6 |
| 3 | 3 | 9 |
| 4 | 1 | 4 |
| | n = 17 | 27 |

mean no. of targets acquired = 1.59

Standard deviation = 1.10

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Table 90: Number of target behaviours related to 'going' established before and by the end of Experiment II.

| Established targets | No. of Patients | | No. of Targets | |
|---|---|---|---|---|
| | Pre-Exp. | End of Exp. II | Pre-Exp | End of Exp. II |
| 13 - 16 (incl) | 0 | 1 | 0 | 4 |
| 13 - 15 (incl) | 0 | 1 | 0 | 3 |
| 13 and 14 only | 1 | 1 | 2 | 2 |
| 13 only | 4 | 14 | 4 | 14 |
| none | 12 | 0 | 0 | 0 |
| | n = 17 | n = 17 | 6 | 23 |

Mean no. of targets established at end = 1.35

Standard deviation = 0.83

Table 91: Distribution of the experimental group (E II) by the number of 'going' targets acquired during Experiment II.

| No. of targets acquired | No. of patients (f) | (fx) |
|---|---|---|
| 0 | 3 | 0 |
| 1 | 11 | 11 |
| 2 | 3 | 6 |
| 3 | 0 | 0 |
| 4 | 0 | 0 |
| | n = 17 | 17 |

Mean no. of targets acquired = 1.00

Standard deviation = 0.59

Table 92 : Number of target behaviours established before and by the end of Experiment II by patients in the experimental group (EII).

| Pt. | ELIMINATING | | | SITTING | | | DRESSING | | | GOING | | | ALL TARGETS | | | % of Final TARGET |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | |
| 51 | 1 | 3 | 4 | 1 | 3 | 4 | 0 | 3 | 3 | 1 | 0 | 1 | 3 | 9 | 12 | 75·0 |
| 31 | 2 | 2 | 4 | 2 | 1 | 3 | 1 | 1 | 2 | 1 | 0 | 1 | 6 | 4 | 10 | 62·5 |
| 32 | 2 | 2 | 4 | 2 | 2 | 4 | 1 | 3 | 4 | 1 | 2 | 3 | 6 | 9 | 15 | 93·8 |
| 15 | 2 | 2 | 4 | 1 | 3 | 4 | 1 | 2 | 3 | 1 | 0 | 1 | 5 | 7 | 12 | 75·0 |
| 30 | 2 | 2 | 4 | 3 | 1 | 4 | 2 | 2 | 4 | 2 | 2 | 4 | 9 | 7 | 16 | 100·0 |
| 35 | 0 | 3 | 3 | 0 | 4 | 4 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 10 | 10 | 62·5 |
| 39 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 8 | 50·0 |
| 21 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 2 | 2 | 0 | 11 | 11 | 68·8 |
| 25 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 8 | 50·0 |
| 42 | 0 | 2 | 2 | 0 | 4 | 4 | 0 | 4 | 4 | 0 | 1 | 1 | 0 | 11 | 11 | 68·8 |
| 14 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 8 | 50·0 |
| 68 | 0 | 2 | 2 | 0 | 3 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 7 | 7 | 43·8 |
| 67 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 8 | 50·0 |
| 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 6·3 |
| 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 6·3 |
| 29 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 3 | 3 | 18·8 |
| 33 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 3 | 3 | 18·8 |
| Totals: | 9 | 33 | 42 | 9 | 38 | 47 | 5 | 27 | 32 | 6 | 17 | 23 | 29 | 115 | 144 | |

A = No. established before programme

B = No. acquired during programme

C = No. established at end of programme

Figure 36 : Acquisition of targets related to toilet behaviour (targets 1-16) by the experimental group (EII) at the end of Experiment II.

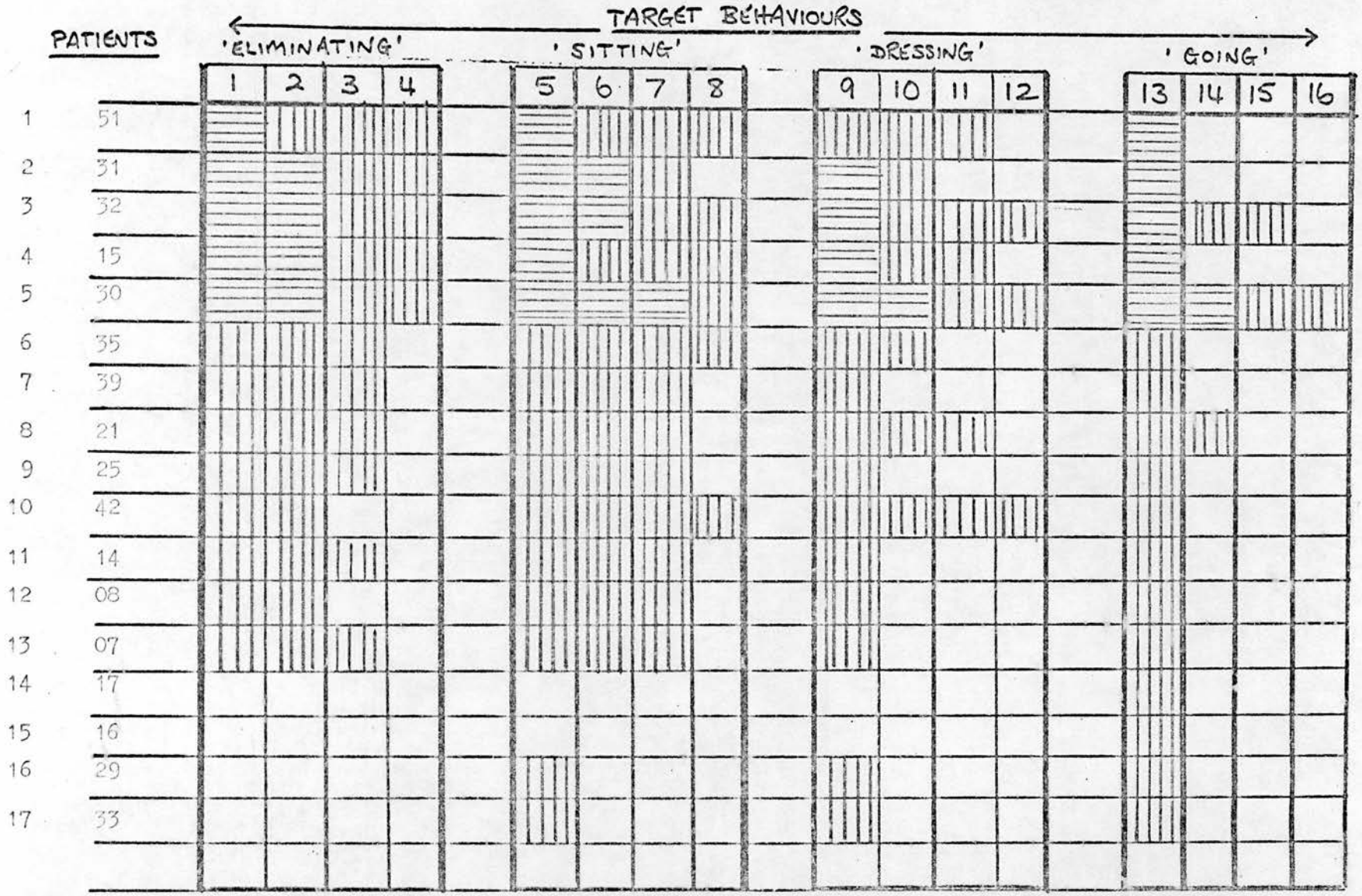

Table 93: Distribution of patients in the experimental group (E II) by percentage of final target behaviour (16 targets) established by the end of Experiment II .

| No. of Target Behaviours | % of Final Target Behaviour. | No. of Patients. |
|---|---|---|
| 16 | 100.00 | 1 |
| 15 | 93.8 | 1 |
| 14 | 87.5 | 0 |
| 13 | 81.3 | 0 |
| 12 | 75.0 | 2 |
| 11 | 68.8 | 2 |
| 10 | 62.5 | 2 |
| 9 | 56.3 | 0 |
| 8 | 50.0 | 4 |
| 7 | 43.8 | 1 |
| 6 | 37.5 | 0 |
| 5 | 31.3 | 0 |
| 4 | 25.0 | 0 |
| 3 | 18.8 | 2 |
| 2 | 12.5 | 0 |
| 1 | 6.3 | 2 |
| | | n = 17 |

Mean no target behaviours established = 8.47

Median no. " " " = 8

Mean % final target behaviour established = 52.93%

Table 94 : Target behaviours established before, acquired during, and established by the end of Experiment II in the experimental group (E II) on the model of shaping of toilet behaviour.

| | 'BEFORE' | | 'ACQUIRED DURING' | | | 'ESTABLISHED AT END' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. estab. before | Mean no. estab. before | No. of targets acquired during | Mean no. of targets acquired during | Standard Deviation | No. estab. at end | Mean no. estab. at end | Standard Deviation | % final target behaviour estab. at end | % gain over baseline |
| 1-4 ('eliminating') | 9 | 0.5 | 33 | 1.94 | 1.16 | 42 | 2.47 | 1.50 | 61.75 | 49.25 |
| 5-8 ('sitting') | 9 | 0.5 | 38 | 2.24 | 1.26 | 47 | 2.76 | 1.36 | 69.00 | 56.50 |
| 9-12('dressing') | 5 | 0.29 | 27 | 1.59 | 1.10 | 32 | 1.88 | 1.32 | 47.00 | 41.75 |
| 13-16('going') | 6 | 0.35 | 17 | 1.00 | 0.59 | 23 | 1.35 | 0.83 | 33.75 | 25.00 |
| 1-16 (ALL TARGETS) | 29 | 1.70 | 115 | 6.76 | 3.12 | 144 | 8.47 | 4.31 | 52.94 | 42.32 |

(33 ; mean of 1.94 per patient), established by the end of (42 ; mean of 1.50 per patient), and percentage increase over baseline (56.50%) is the 'eliminating' area (targets 1 - 4). In the 'dressing' area (targets 9 - 12), 47.00% (32 targets; mean of 1.88) of targets are established by the end of Experiment II. This percentage increase over baseline is 41.75%. The least improvement in toilet behaviour occurs in the 'going' area (targets 13 - 16). The percentage increase over baseline is only 25.00% The percentage of the targets established by the end of the programme is 33.75% (23 targets; mean of 1.35 per patient).

On the model overall, 115 targets are acquired (mean of 6.76 per patient; S.D. = 3.12) which brings the number established at the end of Experiment II to 144 (mean of 8.47; S.D. = 4.31) This represents 52.94% of the final target behaviour and a percentage increase over baseline of 42.32%

(iii) Improvement in general level of functioning:

The scores gained by patients in the experimental group (E II) on the total P-PAC and the four quadrants are contained in Table 95. Included are calculations of the number of skills gained and the percentage gain over baseline. All 17 patients show an increase on the total score at the post-experimental assessment. All 17 patients increase (or remain equal) in their score on each quadrant of the P-PAC. At the pre-experimental assessment, scores on the total P-PAC range from 24 (P. 16) to 97 (P. 30). At the post experimental assessment the scores range from 30 (P. 16) to 111 (P. 30). The number of skills gained ranges from 1 (P. 29) to 27 (P. 32), this representing a range in percentage gain over baseline of 0.8% - 20.7%. In four patients only (Ps. 17, 16, 29 and 33), the percentage gain over baseline is less than 10.00%. 1 patient only (P 32) has a percentage gain over baseline in excess of 20% (20.7%) and the remaining 12 patients show gains over baseline between 10.8% and 17.7%

Table 95 : P-PAC scores of patients in the experimental group (EII) at the pre- and post-experimental assessments of Experiment II.

| Pt. | SELF - HELP | | COMMUN-ICATION | | SOCIAL-ISATION | | OCCUPAT - ION | | TOTAL P-PAC | | TOTAL P-PAC | | GAIN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post | % Pre | % Post | % Gain | No. scales C.I.w.D |
| 51 | 26 | 36 | 13 | 15 | 12 | 14 | 25 | 27 | 76 | 92 | 58·5 | 70·8 | 12·3 | 16 |
| 31 | 23 | 30 | 11 | 15 | 8 | 9 | 13 | 17 | 55 | 71 | 42·3 | 54·6 | 12·3 | 16 |
| 32 | 29 | 40 | 14 | 19 | 11 | 17 | 20 | 25 | 74 | 101 | 57·0 | 77·7 | 20·7 | 27 |
| 15 | 23 | 32 | 13 | 17 | 10 | 16 | 18 | 22 | 64 | 87 | 49·2 | 66·9 | 17·7 | 23 |
| 30 | 30 | 40 | 26 | 28 | 17 | 18 | 24 | 25 | 97 | 111 | 74·6 | 85·4 | 10·8 | 14 |
| 35 | 16 | 25 | 9 | 16 | 5 | 8 | 13 | 16 | 43 | 65 | 33·1 | 50·0 | 16·9 | 22 |
| 39 | 15 | 22 | 11 | 14 | 7 | 10 | 11 | 16 | 44 | 62 | 33·9 | 47·7 | 13·8 | 18 |
| 21 | 17 | 25 | 22 | 25 | 12 | 16 | 12 | 14 | 63 | 80 | 48·5 | 61·5 | 13·0 | 17 |
| 25 | 12 | 20 | 6 | 11 | 6 | 8 | 7 | 10 | 31 | 49 | 23·8 | 37·7 | 13·9 | 18 |
| 42 | 22 | 29 | 15 | 17 | 12 | 15 | 18 | 21 | 67 | 82 | 51·5 | 63·1 | 11·6 | 15 |
| 14 | 14 | 22 | 9 | 14 | 3 | 6 | 11 | 12 | 37 | 54 | 28·5 | 41·5 | 13·0 | 17 |
| 08 | 12 | 21 | 16 | 18 | 11 | 15 | 15 | 16 | 54 | 70 | 41·5 | 53·9 | 12·4 | 16 |
| 07 | 10 | 20 | 8 | 10 | 5 | 7 | 9 | 12 | 32 | 49 | 24·6 | 37·7 | 13·1 | 17 |
| 17 | 13 | 14 | 8 | 9 | 2 | 4 | 6 | 8 | 29 | 35 | 22·3 | 26·9 | 4·6 | 6 |
| 16 | 12 | 13 | 9 | 9 | 2 | 4 | 1 | 4 | 24 | 30 | 18·5 | 23·1 | 4·6 | 6 |
| 29 | 11 | 12 | 9 | 9 | 3 | 3 | 10 | 10 | 33 | 34 | 25·4 | 26·2 | 0·8 | 1 |
| 33 | 25 | 28 | 23 | 24 | 11 | 13 | 17 | 20 | 76 | 85 | 58·5 | 65·4 | 6·9 | 9 |
| | 310 | 429 | 222 | 270 | 137 | 183 | 230 | 275 | 899 | 1157 | | | | 258 |

Table 96: P-PAC scores of the experimental group (E II) at pre- and post-experimental assessments of Exp. II.

| P-PAC | Number of skills | Scores | | | |
|---|---|---|---|---|---|
| | | Pre-Experimental | | Post-Experimental | |
| | | N | % | N | % |
| TOTAL | 130 | 899 | 40.68 | 1157 | 52.35 |
| 'self-help' | 41 | 310 | 44.48 | 429 | 61.55 |
| 'communication' | 38 | 222 | 34.37 | 270 | 41.79 |
| 'socialisation' | 21 | 137 | 38.37 | 183 | 51.26 |
| 'occupation' | 30 | 230 | 45.09 | 275 | 53.92 |

Talbe 97: Number, mean number per patient, and percentage gain in scores of the experimental group (E II) during Experiment II on P-PAC total and quadrants.

| P-PAC | Pre-Exp Score | Post-Exp. Score | No. of skills gained | Mean Gain per patient | Percentage Gain over baseline |
|---|---|---|---|---|---|
| 'self-help | 310 | 429 | 119 | 7.00 | 17.07 |
| 'communication | 222 | 270 | 48 | 2.82 | 7.43 |
| 'socialisation | 137 | 183 | 46 | 2.71 | 12.89 |
| 'occupation | 230 | 275 | 45 | 2.65 | 8.82 |
| TOTAL P-PAC | 899 | 1157 | 258 | 15.18 | 11.67 |

In the group as a whole, the total number of skills scored on the total P-PAC increased from 899 at the pre-experimental assessment to 1157 at the post-experimental assessment. The percentage gain over baseline is 11.67% (from 40.68% to 52.35%). (See Table 96).

Referring to the quadrants of the P-PAC, the 'self-help' quadrant shows the greatest percentage gain over baseline (17.07%), from 44.48% (310 skills) in the pre-experimental assessment to 61.55% (429 skills) in the post-experimental assessment. Ranking second to this is the 'socialisation' quadrant with a 12.89% gain over baseline (46 skills). Similar numbers of skills (48 and 45 respectively) are gained in the 'communication' and 'occupation' quadrants. The gain over baseline is, however, slightly higher in the latter at 8.82%. The gain in the 'communication' quadrant at 7.43% is, therefore, the lowest of the four quadrants. (See Table 97).

2. Comparison of the results of Experiments II and I:-

The results presented above show the effect of the experimental influence (the toilet training programme) during Experiment II on the experimental group (E II). These treat Experiment II as an independent study. If, however, Experiment II is considered as a replica study (replication of Experiment I), then its results can be compared with those of Experiment I in order to test the validity of the results of that first experiment.

This comparison of the results of Experiments I and II is made in relation to measures obtained on three dependent variables in each experiment:-

(i) incontinence; frequencies, degrees, prevalence.
(ii) toilet behaviour: acquisition of target behaviours.
(iii) general level of functioning: P-PAC data.

Table 98 : Numbers of elimination responses (all eliminations, incontinent elimination and eliminations in the toilet) in experimental groups I and II at Experiments I and II respectively.



| | Incontinent eliminations | | | | Eliminations in the toilet | | | | All elimination responses | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PRE-EXP | | POST-EXP | | PRE-EXP | | POST-EXP | | PRE-EXP | | POST-EXP | |
| | n | % | n | % | n | % | n | % | n | % | n | % |
| EXPERIMENTAL GROUP I (EI) | 2531 | 76.48 | 1238 | 25.81 | 723 | 25.52 | 3558 | 74.19 | 3074 | 100 | 4796 | 100 |
| EXPERIMENTAL GROUP II (EII) | 2500 | 74.05 | 1278 | 28.29 | 876 | 25.95 | 3240 | 71.71 | 3376 | 100 | 4518 | 100 |

Reduction in percentage of incontinent eliminations:-

Experimental group I : 50.67 %

Experimental group II : 45.76 %

(i) Incontinence:

Table 98 contains the pre- and post-experimental frequencies of elimination responses for experimental groups I and II. It is evident that the changes which occured are similar within both groups. In both groups, the frequency of incontinent eliminations is reduced by about 1000 by the post-experimental phase (1113 in E.I.; 1222 in E II). The frequency of eliminations in the toilet increases in both groups by about 2500 (2835 in E.I.; 2364 in E. II). In each case the frequency of all eliminations increases (by 1722 in E I and 1142 in E. II). The results of Experiments I and II in respect of changes in the frequency of elimination responses are highly similar.

Comparison of percentages of incontinent eliminations and eliminations in the toilet presents a more directly comparable result. The percentage of all eliminations which are incontinent eliminations, is, in experimental Group I, 76.48% at the pre-experimental phase and is 74.05% in experimental group II. The baselines are therefore seen to be almost equivalent. In the post-experimental phases, experimental group I shows a reduction of 50.67% to 25.81%; and experimental group II a reduction of 45.76% to 28.25%. (Percentage figures are shown in Table 98 also). The reduction in percentage of incontinent eliminations is slightly higher in Experimental Group I, but results can be said to be highly similar.

Table 99: Mean degree of incontinence of Experimental Groups I and II at the pre- and post-experimental phases of the respective Experiments.

| | Mean Degree of Incontinence (%) | |
|---|---|---|
| | Pre-Exp. | Post-Exp. |
| Experimental Group I | 81.777 | 32.888 |
| Experimental Group II | 81.764 | 33.000 |

Table 100: Prevalence of total incontinence and number of patients maintained in nappies at the pre- and post-experimental phases of Experiment I for experimental group I (E I): and Experiment II for experimental group II (E II).

| | Prevalence of total incontinence. | | | | Use of Nappies. | | | |
|---|---|---|---|---|---|---|---|---|
| | Pre-Exp. | | Post-Exp. | | Pre-Exp. | | Post-Exp. | |
| | % | N | % | N | % | N | % | N |
| E I (n = 18) | 72.22 | 13 | 22.22 | 4 | 72.22 | 13 | 22.22 | 4 |
| E II (n = 17) | 70.59 | 12 | 17.64 | 3 | 70.59 | 12 | 23.52 | 4 |

In respect of the mean degree of incontinence, there is no significant difference between that of the pre-experimental degree in both experimental groups (E I:- 81.78%: E II:- 81.76%) or that of the post-experimental degree (E I:- 32.89%; E II:- 33.00%). A mean reduction of approximately 49% in degree of incontinence is achieved in both experimental groups (See Table 99).

Table 100 provides further support of the similarity of results in terms of the less specific measures of (a) reduction in the prevelance of 'total incontinence' (50% in E I and 52.95% in E II); and (b) prevelance of the use of nappies (50% in E I and 47.07% in E II).

(ii) Toilet behaviour:

Whether or not the improvements in toilet behaviour made by the two groups (E I and E II) are similar can be ascertained by comparing the target behaviours of the model acquired and established by the end of Experiments I and II. Table 101 contains data on the four areas of the model and the complete model. In relation to the complete model, results of the first experiment (E I) show that 55.90% of the final target behaviour is established by the end of the programme. The percentage gain over baseline amounts to 47.91%. In the second experiment (E II), 52.94% of the final target behaviour is established and this represents a percentage gain over baseline of 42.32%. These results can be considered to be similar. It requires to be noted that experimental group I shows marginally greater improvement in toilet behaviour than experimental group II.

The mean numbers of targets established by the end of the two experiments in the four areas of the model are highly similar. On the 'eliminating' targets, experimental group I establishes a mean of 2.61 targets and experimental group II a mean of 2.47. On the 'sitting' targets, experimental group I establishes a mean of 3.00 targets and experimental group II a mean of 2.76. On the 'dressing' targets, experimental group I establishes a mean of 1.80 targets and

Table 101 : Target behaviours established in Experiments I and II by experimental groups I and II respectively on the model of shaping toilet behaviour.

← TARGET BEHAVIOURS →

| | (1-4) 'eliminating' | | | | (5-8) 'sitting' | | | | (9-12) 'dressing' | | | | (13-16) 'going' | | | | ALL TARGETS (1-16 incl.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean no. acq. | No. est. | Mean no. est. | S.D. | Mean no. acq. | No. est. | Mean no. est. | S.D. | Mean no. acq. | No. est. | Mean no. est. | S.D. | Mean no. acq. | No. est. | Mean no. est. | S.D. | No. est. | Mean no. est. | S.D. | % of final target | % gain over baseline |
| EXPERIMENTAL GROUP I (EI) n=18 | 2.17 | 47 | 2.61 | 2.12 | 2.72 | 54 | 3.00 | 1.15 | 1.61 | 34 | 1.89 | 0.93 | 1.17 | 26 | 1.44 | 0.61 | 161 | 8.94 | 3.77 | 55.90 | 47.91 |
| EXPERIMENTAL GROUP II (EII) n=17 | 1.94 | 42 | 2.47 | 1.50 | 2.24 | 47 | 2.76 | 1.36 | 1.59 | 32 | 1.88 | 1.32 | 1.00 | 23 | 1.35 | 0.83 | 144 | 8.47 | 4.31 | 52.94 | 42.32 |

acq. = acquired
est. = established

and experimental group II a mean of 1.88. On the 'going' targets, experimental group I establishes a mean of 1.44 and experimental group II a mean of 1.35.

It is therefore concluded that, although experimental group I shows marginally greater improvement in toilet behaviour, and each of the four areas within it, the results of Experiments I and II are highly similar.

(iii) General level of functioning:

Previous results show that Experimental Groups I and II demonstrate substantial improvement in their general level of functioning, as assessed on the P-PAC. In each case this improvement is seen to occur in relation to all classes of behaviour (quadrants and sections of P-PAC) and all levels of behaviour (levels of P-PAC).

Calculation of t-tests was performed on the difference between the mean post-experimental scores of experimental groups I and II on the quadrants, sections and levels of the P-PAC. There is no significant difference between the results of both groups on any of the variables tested. Table 102 shows the calculations in respect of 'the self-help' quadrant of the P-PAC.

Table 102 : Calculation of t-tests on the difference between the mean scores of the experimental groups (EI and EII) after Experiments I and II respectively in relation to 'self-help' skills (P-PAC).

| P-PAC | GROUP | n | Mean (%) | S.D. | S.E. | F value | 2-tail prob. | Pooled Variance estimate | | | Separate variance estimate | | | SIGNIFICANCE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | T value | df | 2-tail prob. | T value | df | 2-tail prob. | |
| EATING section | E I | 18 | 53.05555 | 16.304 | 3.843 | 2.09 | 0.141 | -1.24 | 33 | 0.223 | -1.23 | 28.27 | 0.229 | * |
| | E II | 17 | 61.5294 | 23.598 | 5.723 | | | | | | | | | |
| Mobility section | E I | 18 | 71.2778 | 11.002 | 2.593 | 2.55 | 0.063 | -0.58 | 33 | 0.568 | -0.57 | 26.60 | 0.574 | * |
| | E II | 17 | 74.1176 | 17.578 | 4.263 | | | | | | | | | |
| Dressing section | E I | 18 | 44.2778 | 18.097 | 4.266 | 2.08 | 0.146 | -1.40 | 33 | 0.169 | -1.39 | 28.35 | 0.175 | * |
| | E II | 17 | 54.8823 | 26.069 | 6.323 | | | | | | | | | |
| Toilet and washing section | E I | 18 | 48.3333 | 19.778 | 4.662 | 2.40 | 0.082 | 0.28 | 33 | 0.779 | 0.28 | 27.19 | 0.782 | * |
| | E II | 17 | 45.8823 | 30.631 | 7.429 | | | | | | | | | |
| SELF-HELP QUADRANT | E I | 18 | 56.000 | 12.319 | 2.904 | 2.64 | 0.055 | -0.81 | 33 | 0.423 | -0.80 | 26.32 | 0.431 | * |
| | E II | 17 | 60.5294 | 20.022 | 4.856 | | | | | | | | | |

* NOT significant

CHAPTER 11

RESULTS (III) - Miscellaneous results.

1. Results of long-term follow-up evaluation.
2. Further analysis of P-PAC data.
3. Results pertaining to the total patient population.
4. Results pertaining to the patients who showed no/minimal improvement as a result of toilet training.
5. Some findings related to the acquisition of continence and toilet behaviour.
6. Results of the study of nurses' work activities.
7. Evaluation of nurse training.

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## 1. Results of long-term follow-up evaluation

This evaluation refers to assessments of (i) degree of incontinence; (ii) level of toilet behaviour; and (iii) general level of functioning made on patients contained in Experimental Groups I and II and the control group for Experiment I. These are related to previous data from assessments. Data obtained in relation to Experimental Group I during Assessment 3 is introduced here. Results presented have been selected to indicate trends and major developments rather than inclusion of all results obtained.

### (i) Degree of incontinence:

The degree of incontinence at the follow-up evaluation (Assessment 4) is calculated from the data obtained in the 10-day recording of elimination response frequencies. Tables 103 and 104 contain the degree of incontinence of patients in experimental group I and those in control group I/experimental group II at the four assessments. Figure 37 presents these data graphically in histograms, the two

Table 103: Degree of incontinence of patients in experimental group I (n = 18) at the four assessments.

| | Degree of Incontinence (%) | | | |
|---|---|---|---|---|
| | Assess-ment 1 | Assess-ment 2 | Assess-ment 3 | Assessment 4 |
| Code | Pre-Exp. Exp. I | Post-Exp. Exp. 1 | Post-Exp. Exp. II | Follow- up |
| 53 | 25 | 02 | 04 | 02 |
| 40 | 33 | 07 | 01 | 04 |
| 49 | 28 | 10 | 04 | 11 |
| 01 | 60 | 13 | - | - |
| 05 | 61 | 21 | 15 | 24 |
| 26 | 98 | 12 | 13 | 10 |
| 22 | 96 | 08 | 08 | 16 |
| 19 | 97 | 15 | 24 | 29 |
| 18 | 95 | 08 | 42 | 16 |
| 28 | 97 | 08 | 08 | 15 |
| 04 | 99 | 18 | 03 | 0 |
| 10 | 97 | 25 | 12 | 11 |
| 48 | 96 | 28 | 23 | 21 |
| 45 | 98 | 27 | 12 | 14 |
| 36 | 97 | 100 | 100 | 90 |
| 44 | 98 | 93 | 100 | 82 |
| 27 | 97 | 99 | 100 | 100 |
| 02 | 100 | 98 | 100 | 85 |

n = 18

Table 104: Degree of incontinence of patients in control group I/ experimental group II (n = 17) at the four assessments.

| | | Degree of Incontinence % | | | |
|---|---|---|---|---|---|
| | | Assess-ment 1 | Assess-ment 2 | Assess-ment 3 | Assessment 4 |
| | Code | Pre-Exp Exp. I | Pre-Exp Exp. II | Post-Exp. Exp. II | Follow-up |
| CI/ E II | 51 | 37 | 51 | 06 | 08 |
| | 31 | 32 | 37 | 07 | 04 |
| | 32 | 19 | 32 | 04 | 02 |
| | 15 | 49 | 39 | 07 | 08 |
| | 30 | 23 | 31 | 0 | 02 |
| | 35 | 97 | 100 | 12 | 11 |
| | 39 | 99 | 100 | 25 | 15 |
| | 21 | 98 | 100 | 14 | 13 |
| | 25 | 98 | 100 | 18 | 17 |
| | 42 | 99 | 100 | 28 | 24 |
| | 14 | 98 | 100 | 21 | 35 |
| | 08 | 99 | 100 | 20 | 31 |
| | 07 | 98 | 100 | 14 | 20 |
| | 17 | 100 | 100 | 100 | 89 |
| | 16 | 97 | 100 | 100 | 98 |
| | 29 | 98 | 100 | 96 | 90 |
| E II only | 33 | 98 | 100 | 89 | 86 |
| n = 17 | | | | | |
| C I only | 11 | 97 | 100 | 100 | 82 |
| | 38 | 97 | 100 | 100 | 87 |

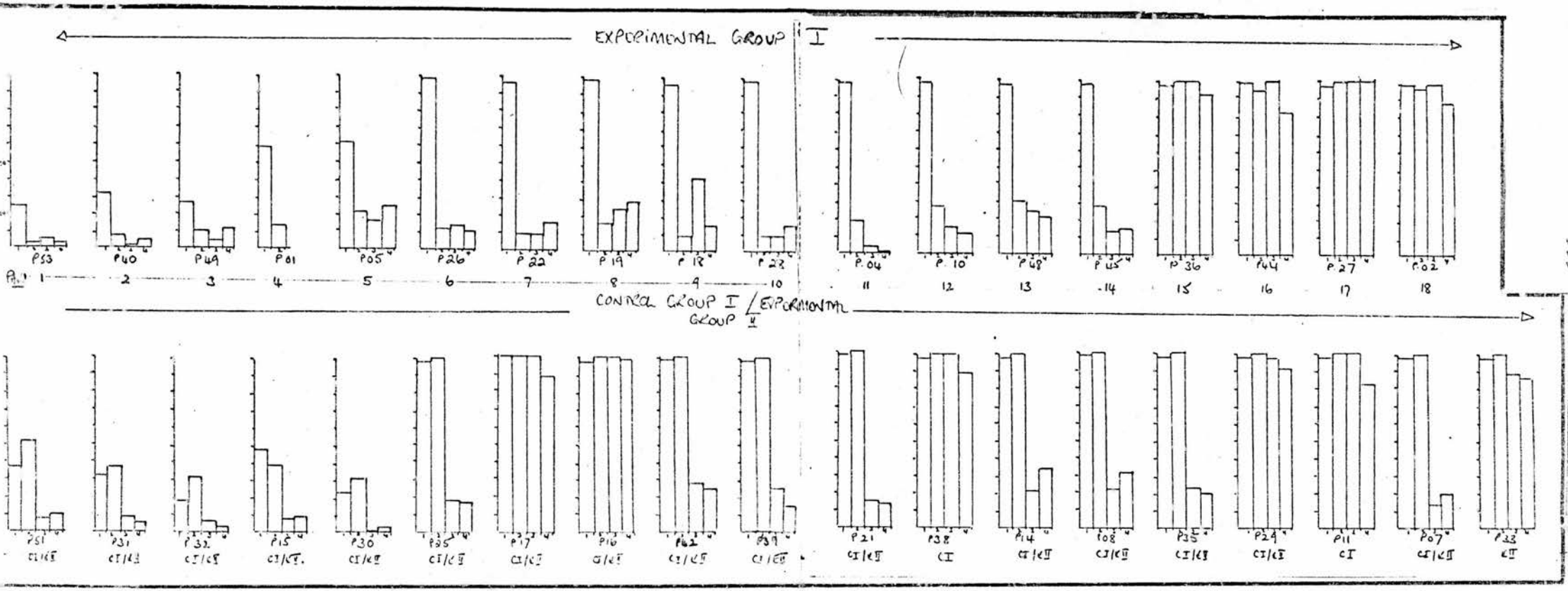



Figure 37 : Histograms of the degree of incontinence of patients in the research sample at the four assessments of the study.

groups being ordered according to the original pairing at selection. With respect to experimental group I, Experiment I occurs between Assessments 1 and 2. In experimental group II, Experiment II occurs between Assessments 2 and 3. Assessment 4 provides the follow-up evaluation on both groups, with Assessment 3 providing an interim follow-up on experimental group I. The reduction in degree of incontinence caused by the experiments is made comparing the relevant pre- and post-experimental assessments. Subsequent regression (or progression) can be identified by comparing (i) Assessment 4 with the relevant post-experimental assessment (2 for E I.; 3 for E II) to assess whether the reduction gained is maintained; and (ii) Assessment 4 with the relevant pre-experimental assessment (1 for E I; 2 for E II) to assess whether regression to pre-training level of performance is present.

It is earlier shown that 4 patients in experimental group I (Ps 36, 44, 27, 02), and 4 patients in experimental group II (Ps 17, 16, 29, 33) did not show any (or more than minimal) reduction in their degree of incontinence by the post-training phase. Two patients selected to the control group (C I) in the first instance (Ps 11, 38) were not included in experimental group II. A total of 10 patients out of the research sample (n = 37) is therefore considered separately here. Examination of the data on these patients shows that 2 patients (P.27, P 16) remain totally incontinent at the fourth assessment. The other 8 patients were commenced on a toilet training programme by the ward nursing staff about one month prior to the follow-up evaluation. Some progress is evident in all of these patients at this early stage of training, with the degree of incontinence being 90% or less at the fourth assessment (range 82% - 90%).

Regression (or progression) can be looked for in relation to the 27 patients of the research sample who did show reduction in the degree of incontinence at the post-training phase.

In experimental group I, 14 patients achieved reduction in the degree of incontinence at the post-experimental phase (Assessment 2). One patient (P01) left the ward after this, and so no subsequent data are available. 13 patients remain to be considered. None of these patients show regression to pre-training level of performance (i.e. baseline/Assessment 1), by the follow-up evaluation. Three patients (Ps 53, 40 and 26) maintain, at the third and fourth assessments, the degree of continence achieved by the post-experimental phase. That is, they have not regressed or progressed. Two of these patients (Ps 53 and 40) could in fact, not progress having reached (almost) total continence. Four patients (Ps 04, 10, 48 and 45) show steady progress at Assessments 3 and 4., the degree of incontinence being reduced at each period. Four patients (Ps 49, 05, 22, 28) show no regression by the third assessment, but slight regression (less than 10%) by the fourth assessment. The remaining 2 patients(Ps 19 and 18) show individual patterns. P 19 is the only patient to display increasing regression at Assessments 3 and 4. At the post-experimental phase, the degree of incontinence is 15%. This increases to 24% at Assessment 3 and to 29% at Assessment 4. The degree of regression from the post-experimental phase therefore amounts to 14% . Despite this, there is not regression to the pre-experimental level (97%) There is no circumstantial evidence to explain this patient's regression. P 18 is interesting in that he has the greatest degree of regression (34%) by the third assessment, but shows progression by the follow-up evaluation to 16% degree of incontinence. This is8% greater than

that of the post-experimental degree, but does not come near to regression to pre-training level of performance (95%). This patient was ill for some weeks during Experiment II and is said to have regressed on that account.

In experimental group I, then, no patient regressed to pre-training level of performance. Three patients maintain their post-experimental level. Four patients progressed steadily. Four patients showed no regression at Assessment 3, but slight regression by Assessment 4. One patient regressed initially, but subsequently progressed.

In experimental group II, 13 patients achieved reduction in the degree of incontinence at the post-experimental phase. None of these patients shows regression to pre-training level of performance. Nine patients (Ps 51, 31, 32, 15, 30, 25, 42, 21, 35) maintain the level achieved by the post-experimental phase. Five of these patients (Ps 51, 31, 32, 15, 30) reached almost total continence and could not, therefore, progress further. One patient (P 39) showed progress over post-experimental level (reduction from 25% to 15%). Three patients demonstrate slight regression (Ps 14, 08, 07) by the follow-up evaluation. The greatest degree of regression occurs in P 14; and examination of response frequencies shows this to be accounted for by a loss of night-time continence.

The situation of the research sample by the follow-up evaluation can therefore be summarised. A total of 10 patients failed to show a reduction in the degree of incontinence post-experimentally. Two of the patients remain totally incontinent, while the remaining 8 are showing slight improvement at the fourth assessment. A total of 27 patients achieved reductions in the degree of incontinence on account of the two experimental toilet training programmes. None

of these patients displays regression to pre-training level of performance. 12 patients maintain the level achieved post-experimentally at subsequent assessments. Five patients show improvement subsequent to the post-experimental assessment. 10 patients demonstrate some degree of regression at subsequent assessment, but the degree of regression is slight, not exceeding 10% in most cases.

(ii) Level of toilet behaviour:

The target behaviours established by patients in the research sample at the follow-up evaluation are shown in Figures 38i (experimental group I) and 38ii (control group I/ experimental group II). These can be compared with the results presented of the groups at their post-experimental assessment. Those targets established after the post-experimental assessment and by the follow-up evaluation are identified. It is clear that all patients except 3 (Ps 16, 14, and 27) have maintained all of those targets previously established and many patients have acquired targets in addition. Thus, it can be concluded that regression is not evident in terms of toilet behaviour and that further progress has been made. At Assessment 4, 5 patients (Ps 53, 40, 49, 32 and 30) have established all targets and are therefore considered to have fully met the final target behaviour set for the toilet training programmes. Each of these patients was in the group previously "potty trained" before the study commenced. Four patients (Ps 04, 51, 15, 35) have established all but the 16th target, thus coming very close to the final target behaviour.

Table 105 shows the number and mean number of targets established in the four areas of toilet behaviour ('eliminating', 'sitting', 'dressing', 'going') and the percentage of the target behaviour established at the end of the study. Calculations are included

for experimental group I (n = 18), experimental group II (n = 17) and the total research sample (n = 37). The highest number of targets established in the two groups and the total sample occurs in the 'sitting' area (targets 5 - 8). Experimental group I shows the highest mean number per patient (3 • 11). The mean number per patient in experimental group II is 3.06 and in the research sampel is 2.95. Ranked second in terms of the number of targets established is the 'eliminating' area. Experimental group I has a total of 55 targets established (76.39% of the target), with a mean of 3.06 per patient. Experimental group II establishes 72.06% of the target, with a mean number of 2.88 per patient. The two groups are fairly similar with respect to the 'dressing' and 'going' areas. 61.11% of the 'dressing' target is established in experimental group I and 64.71% in experimental group II, this being the only area in which experimental group II is better than experimental group I. Both groups fare worst in the 'going' area of the model. Experimental group I establishes exactly 50.00% of the final target (36 targets; mean of 2.00 per patient); and experimental group II established 48.53% (33 targets; mean of 1.94 per patient).

In the total research sample, 71.62% of 'eliminating' targets are established, 73.65% of 'sitting targets', 60.81% of dressing targets, and 47.30% of 'going' targets. Considering all targets together (targets 1 - 16), 63.34% of the final target behaviour is established. The mean number of targets per patient established at the end of the study in the research sample is 10.14. In experimental group I, the mean number is 10.61 and, in experimental group II, 10.47.

Figure 38(i) : Target behaviours established by patients in experimental Group I (EI) on the model at the follow-up evaluation.

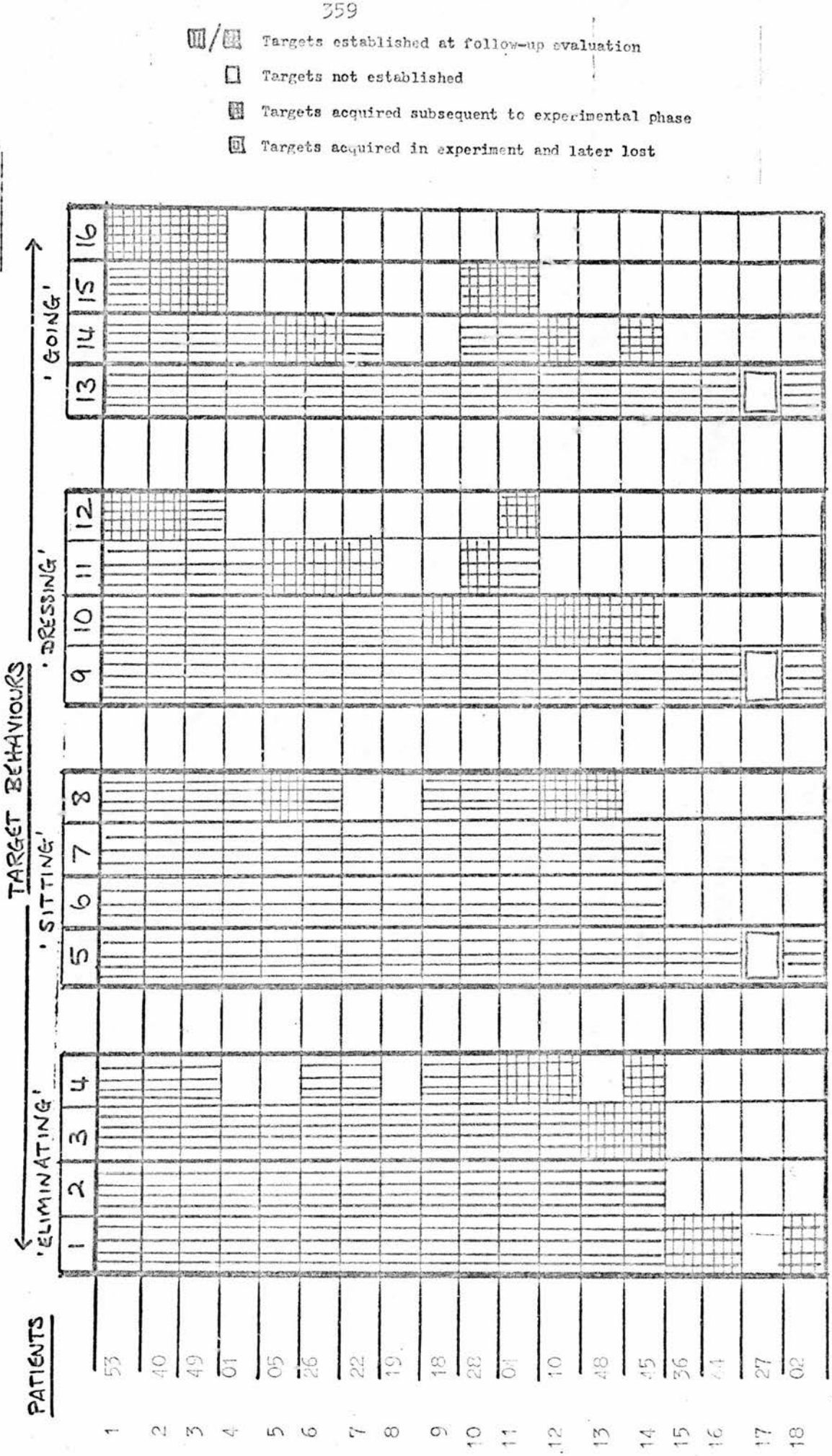


Figure 38 (ii) : Target behaviours established by patients in experimental group I/control group on the model at the follow-up evaluation.

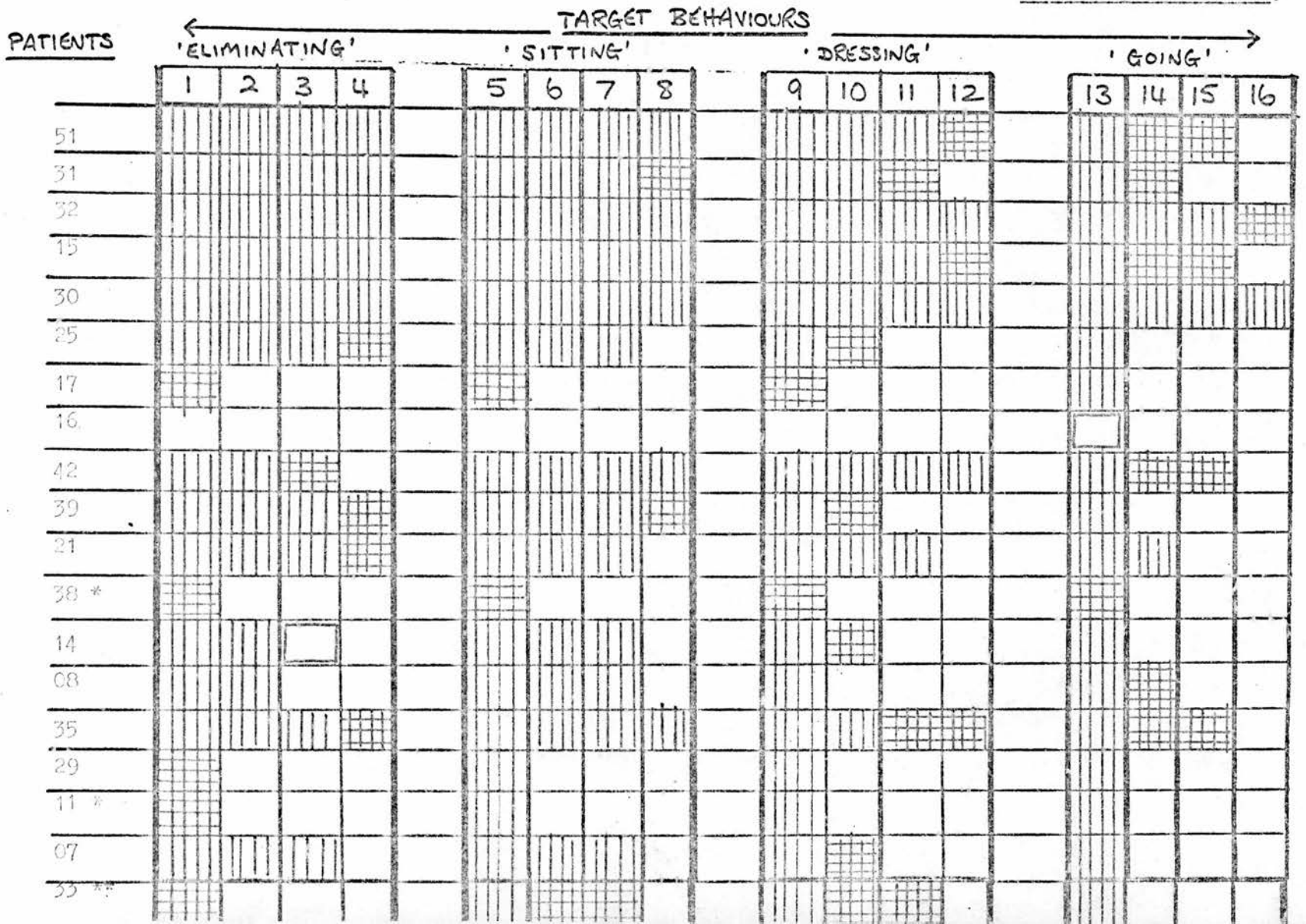


Table 105 : Target behaviours established in the research sample (and experimental groups) at the follow-up evaluation (Assessment 4).

| | EXPERIMENTAL GROUP I (n = 18) | | | | | EXPERIMENTAL GROUP II (n = 17) | | | | | RESEARCH SAMPLE (n = 37) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. post-exp. | No. acquired after exp | No. estab. at Ass 4 | Mean no. at Ass. 4 | % of final target | No. post-exp. | No. acquired after exp | No. estab. at Ass. 4 | Mean no. at Ass 4 | % of final target | No. prior to Ass 4 | No. at Ass 4 | Mean no. at Ass 4 | % of final target |
| (1-4) 'eliminating' | 47 | 8 | 55 | 3.06 | 76.39 | 42 | 8 | 49 | 2.88 | 72.06 | 89 | 106 | 2.86 | 71.62 |
| (5-8) 'sitting' | 54 | 3 | 56 | 3.11 | 77.77 | 47 | 5 | 52 | 3.06 | 76.47 | 102 | 109 | 2.95 | 73.65 |
| (9-12) 'dressing' | 34 | 11 | 44 | 2.44 | 61.11 | 32 | 12 | 44 | 2.59 | 64.71 | 67 | 90 | 2.43 | 60.81 |
| (13-16) 'going' | 26 | 11 | 36 | 2.00 | 50.00 | 23 | 11 | 33 | 1.94 | 48.53 | 50 | 70 | 1.89 | 47.30 |
| (1-16) ALL TARGETS | 161 | 33 | 191 | 10.61 | 66.32 | 144 | 36 | 178 | 10.47 | 65.44 | 308 | 375 | 10.14 | 63.34 |

(iii) General level of functioning:

The improvements in the general level of functioning of experimental groups I and II during Experiments I and II respectively are previously detailed in presentation of the relevant P-PAC data.

Subsequent P-PAC assessment shows that improvements continue to be made by patients in the research sample. In all cases, there is improvement between the third assessment and the long-term follow up(Assessment 4) in terms of an increase in the total P-PAC score. This is shown in Table 106 which contains the total score of all patients at the 4 P-PAC assessments undertaken.

In all cases but six there is an improvement at each of the four assessments. In all of these six cases (Ps 02, 16, 38, 29, 11 and 07), there is at least some improvement by the final assessment as compared with the first assessment. Ps 38, 29, 11 and 07 show no improvement between two of the assessments. Ps 02 and 16 show slight regression at one assessment; P 02 regresses (by 1 credit) at Assessment 3 and P 16 (by 1 credit) at Assessment 2. It is interesting that all but one of these patients (P 07) show minimal or no improvement in terms of reduction in incontinence and acquisition of toilet behaviour by the end of the study. (Ps 38 and 11 were not included in either experimental group; Ps 02, 16, 29 and 07 were all in experimental group II).

The P-PAC data from all 4 Assessments will be further detailed in the following section, the data obtained from the follow-up evaluation clarifying some results and trends observed on the basis of earlier assessments only .

In summary, the P-PAC results at this fourth assessment show that all patients continued to improve in terms of general level of functioning subsequent to the post-experimental phase of the study.

Table 106 : Total P-PAC scores of patients in the research sample (n=37) at the four assessments.

| GROUP | PATIENT | ASSESSMENTS (1 - 4) | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| EI | 53 | 73 | 94 | 104 | 111 |
| | 40 | 53 | 74 | 84 | 90 |
| | 49 | 56 | 85 | 91 | 93 |
| | 01 | 46 | 70 | - | - |
| | 05 | 35 | 59 | 64 | 68 |
| | 26 | 33 | 60 | 68 | 73 |
| | 22 | 31 | 61 | 65 | 72 |
| | 19 | 32 | 51 | 56 | 58 |
| | 18 | 35 | 52 | 54 | 59 |
| | 28 | 47 | 68 | 79 | 85 |
| | 04 | 52 | 74 | 91 | 95 |
| | 10 | 30 | 44 | 51 | 58 |
| | 48 | 43 | 52 | 63 | 67 |
| | 45 | 54 | 68 | 70 | 79 |
| | 36 | 25 | 37 | 39 | 45 |
| | 44 | 32 | 38 | 42 | 48 |
| | 27 | 26 | 36 | 39 | 43 |
| | 02 | 46 | 51 | 50 | 57 |
| EII | 51 | 72 | 76 | 92 | 97 |
| | 31 | 47 | 55 | 71 | 81 |
| | 32 | 65 | 74 | 101 | 107 |
| | 15 | 57 | 64 | 87 | 93 |
| | 30 | 88 | 97 | 111 | 115 |
| | 25 | 27 | 31 | 49 | 58 |
| | 17 | 27 | 29 | 35 | 44 |
| | 16 | 25 | 24 | 30 | 36 |
| | 42 | 51 | 67 | 82 | 87 |
| | 39 | 43 | 44 | 62 | 69 |
| | 21 | 55 | 63 | 80 | 82 |
| | 14 | 36 | 37 | 54 | 64 |
| | 08 | 55 | 54 | 70 | 72 |
| | 35 | 41 | 43 | 65 | 75 |
| | 29 | 33 | 33 | 34 | 37 |
| | 07 | 32 | 32 | 49 | 55 |
| | 33 | 73 | 76 | 85 | 92 |
| CI | 38 | 25 | 25 | 31 | 40 |
| | 11 | 34 | 34 | 35 | 43 |

## 2: Further Analysis of P-PAC Data

(i) Experimental effects:-

That improvements in general level of functioning occured in the research sample over the period of the study is to be expected on the basis of time and maturation alone. The results presented to date, however, suggest that these improvements appear to be quite closely related to the events of the study. A 'substantial' improvement is apparent within both experimental groups concidental with their respective experimental phases. In analysis of the controlled experiment (Experiment I), the mean improvements on the P-PAC of the experimental group (E I) are shown by t-test calculations to be significantly different from those of the control group (C I), suggesting a peripheral effect of the experimental intervention (i.e the toilet training programme). In keeping with anticipated results of this specific intervention, the 'toilet and washing' section is noted to be exceptional in terms of the magnitude of mean improvement and mean difference by the experimental group. Comparison of the P-PAC results of Experiments I and II provides results to support the finding of Experiment I; i.e. that the improvements in general level of functioning are a direct result of the experiment itself (i.e. that there is no significant difference between the post-experimental scores on any of the 19 variables tested). These two sets of similar results from the two experiments are interesting. While statistical analysis is necessary and appears to provide clear evidence of this experimental effect, its implications became most apparent to the researcher from graphic presentation of the P-PAC scores of patients in the research sample at the 4 Assessments. After the follow-up evaluation assessment had been undertaken,

histograms of these scores were prepared. These are shown in Figure 39.

The 37 patients in the research sample are arranged first by the initial grouping (into EI and C I) and then according to matched pairs. (The minor changes within the control group when becoming the experimental group (E II) are noted.) Initial examination of this method of presentation of the data showed the similarity between the baseline score of patients within each pair, and, in comparison, a lack of similarity, on the whole, at the final assessment. That the majority of patients showed improvement at each assessment is clear from the pattern of the histograms. Shading was then applied in those cases where the greatest single improvement in score coincided with the experimental phase of the study. As can be seen from the Figure, this occurs in 27 cases. 15 of these patients are contained in experimental group I (out of 17 patients assessed at 4 assessments); and 12 in experimental group II (out of 17 included in E II). Of the 10 patients not displaying this feature, 6 patients (Ps 44, 02, 17, 16 29 and 33) are those contained within 'non-improved' group (i.e. in relation to response to toilet training). Thus, of the 27 patients who showed improvement in toilet training (i.e. reduction in incontinence/acquisition of toilet behaviour), 24 patients display this phenomenon of the greatest improvement in level of functioning occuring concurrent with the experimental toilet training programme. It is previously shown that these improvements relate across areas of behaviour, but in particular to 'toilet and washing' skills and 'self-help' skills in general.

That the results statistically analysed in relation to the patient groups are seen to affect the majority of the research sample suggest the importance of providing indisputable evidence that the effects are,

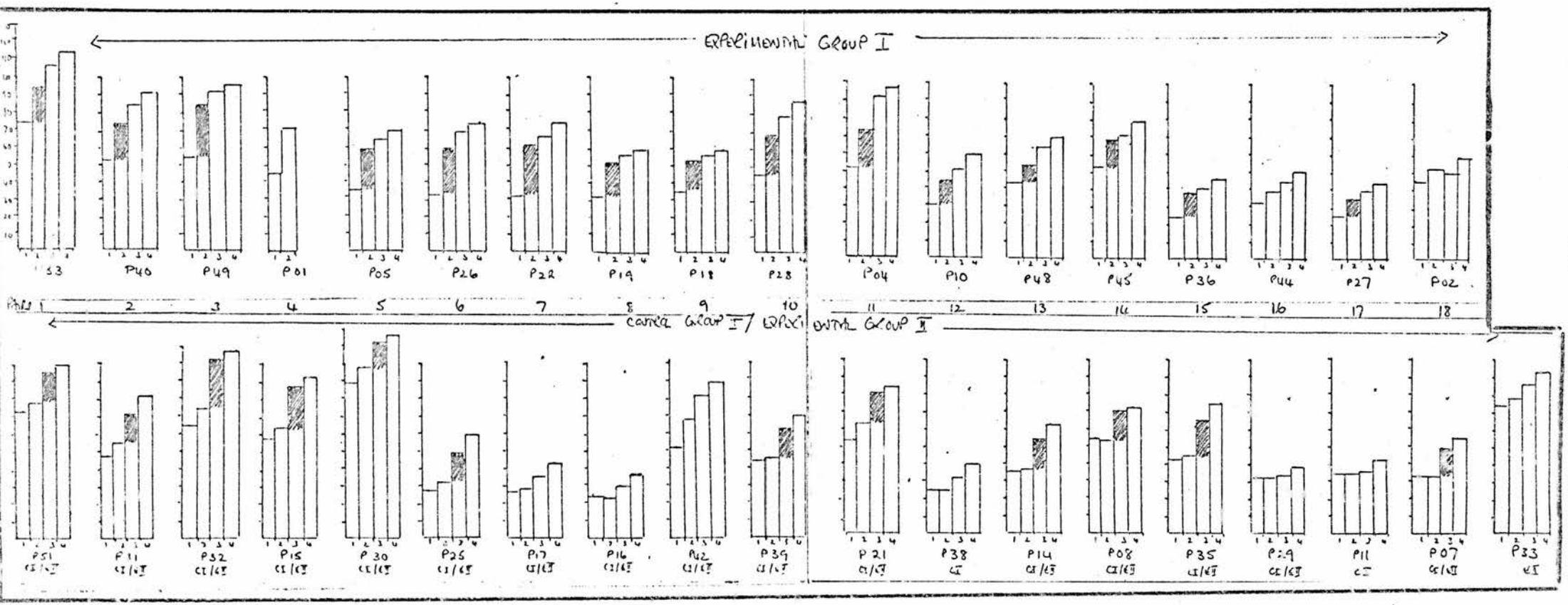



Figure 39 : Histograms of the (absolute) scores on the total P-PAC of patients in the research sample at the four assessments of the study.

in fact, caused by the experimental influence. To this end, three further sets of calculations are presented.

First, the equality of the two groups at baseline (E I and C I) is statistically tested. A t-test is undertaken on the difference between the mean scores of the two groups on 19 variables of the P-PAC at Assessment 1. Table 107 contains these calculations. It can be seen that there is no significant difference between these groups on any of the variables tested. Thus, the two groups are confirmed statistically as being equal in all respects of the P-PAC at baseline.

Secondly, statistical analysis of the improvement in general level of functioning of experimental group II due to Experiment II is contained in Table 108. The calculation of t-tests on the difference between the mean scores at the pre-experimental assessment (Assessment 2) and those at the post-experimental assessment (Assessment 3) shows that improvement in score is significant on all 19 variables tested. On 17 variables, the difference is highly significant at the 1% level and, on the remaining 2 (Level A and Level F) at the 5% level. Thus, in addition to the previously reported finding that the post-experimental improvements of experimental group II are not significantly different from those of experimental group I, the actual improvements are confirmed in their own right.

Thirdly, because experimental group II acted as control group (C I) in Experiment I, it is possible to compare their improvement on the P-PAC during a period of non-intervention (i.e. during Experiment I) with that during their experimental period (i.e. during Experiment II). A t-test is used to calculate the difference between the mean improvement during Experiment I (i.e. Assessment 2 score - Assessment 3 score) and that during Experiment II (i.e. Assessment 3 score - Assessment 2 score).

Table 107 : Calculation of t-tests on the difference between the mean score (%) of experimental groups I and II at Assessment 1 on the P-PAC (main sections and quadrants only shown as results are constant).

| P - PAC | T value | df | 2-tail prob. | Significance |
|---|---|---|---|---|
| Toilet and washing section | 0.19 | 17 | 0.854 | * |
| Self-help quadrant | 0.27 | 17 | 0.794 | * |
| Communication quadrant | - 1.15 | 17 | 0.267 | * |
| Socialisation quadrant | - 1.12 | 17 | 0.276 | * |
| Occupation quadrant | - 1.01 | 17 | 0.325 | * |
| TOTAL P-PAC | - 1.02 | 17 | 0.324 | * |

* NOT significant

Table 108 : Calculation of t-tests on the difference between the mean score (%) of experimental group II at Assessments 2 and 3 on levels, sections and quadrants of the P-PAC *

* Selected results only as being representative of all results (ie on 19 variables).

| P - PAC | Result of t-test | Significance |
|---|---|---|
| Toilet and washing section | T value = -6.42, df = 16, $p < 0.01$ | 1% |
| Self-help quadrant | T value = -8.56, df = 16, $p < 0.01$ | 1% |
| Communication quadrant | T value = -6.26, df = 16, $p < 0.01$ | 1% |
| Socialisation quadrant | T value = -7.32, df = 16, $p < 0.01$ | 1% |
| Occupation quadrant | T value = -7.26, df = 16, $p < 0.01$ | 1% |
| TOTAL P - PAC | T value = -9.88, df = 16, $p < 0.01$ | 1% |

Table 109 : Calculation of t-tests on the difference between mean improvements on P-PAC variables (main ones only shown as results constant) of control group (C1) during Experiments I and II.

| P-PAC | Result of t-test |
|---|---|
| Toilet and washing section | T value = 5.42, df = 16, $p < 0.01$ |
| Self-help quadrant | T value = 6.30, df = 16, $p < 0.01$ |
| Communication quadrant | T value = 3.08, df = 16, $p < 0.01$ |
| Socialisation quadrant | T value = 4.85, df = 16, $p < 0.01$ |
| Occupation quadrant | T value = 3.33, df = 16, $p < 0.01$ |
| TOTAL P-PAC | T value = 6.81, df = 16, $p < 0.01$ |

Table 109 contains the calculations on the 19 variables related to the P-PAC. On only two variables is the difference not significant to the 5% level. These are on Level A and the 'agility' section (i.e. of the 'occupation' quadrant). 13 of the variables are significant at the 1% level. These findings show that the improvements which took place concurrent with the experimental phase of Experiment II are greater than those occuring over just time alone.

This further analysis lends support to the evidence which suggests that the experimental influence itself was responsible for the observed improvements in general level of functioning of the majority of the research sample concurrent with the experimental phases of the study.

(ii) P-PAC assessments of individual patients within the research sample:

The PAC assessment of level of functioning is essentially a tool designed for the assessment of individual mental defectives and is not designed for quantitative analysis and group analysis as has been necessarily undertaken here. In order that the reader has the opportunity to appraise the P-PAC assessments obtained in the course of the study in their conventional form, this section contains a selection of the completed Progress Assessment Charts from which quantitative analysis has derived.

The selection of PAC charts is contained in Figures 40 - 48 and the notes below provide comments upon these.

Fig. 40: One use of the PAC is in visually accentuating the strengths and weaknesses of patients in specific areas of functioning. That ability in self-toileting was a marked weakness within the research sample selected was particularly clear on examination of the PAC at the baseline assessment. This is illustrated here in relation to 4 patients (P 02, P 08, P 33, P 48).

Figs. 41-43: Periodic reassessment is a feature of the PAC in order to allow evaluation of progress and, as is the case in the present study, evaluation of training programmes applied to patients. Just as the histograms presented clearly show the trend of progress overall, so do repeated P-PAC charts on the same patient. In addition, it is possible (by reference to the Key) to see precisely where progress has taken place and in relation to which items specifically.

Figs. 41, 42 and 43: contain the 4 PAC s on three of the patients (Ps 29, 32, 28) in the research sample. P 29 is typical of the minority group of patients which showed minimal progress throughout the period of the study; P 32 represents those patients with a high initial score who contined to progress, the greatest progress coinciding with the experimental phase; P 28 is interesting in that she obtained a low score at Assessment 1 and, despite her age (20 years) at that time, showed considerable progress over a relatively short period.

Figs. 44 and 45: The P-PAC is also available as a 'screening' device, revealing typical patterns which may be useful as diagnostic pointers. The PAC normally presents a picture of fairly even development (although an appreciable weakness in the communication quadrant is common), with a balance between the left (self-help and occupation) and right (communication and socialisation) halves of the diagram.

A PAC showing advanced attainment levels in the left half with under development in the right half is indicative of psychological disturbance. (This is calculated as follows:- If the P-PAC record shows a discrepancy between the two halves larger than that to be expected, as indicated by PE1 then "Pattern D" is said to be present). Thus, the P-PAC can act as a useful screening device.

Fig. 44: shows the PAC s of patient 40 at the four assessments, and the presence of "Pattern D".

Conversely, physical underdevelopment can be highlighted when the left side of the diagram is relatively weaker than the right. This is illustrated in Figure 45 by Patient 53. The imbalance is less obvious here than the converse imbalance of P 40, but the gaps remaining at the 4th assessment fall, in the main part, in the 'mobility' and 'agility' sections of the PAC.

Figs. 46-48: The P-PAC results of the research sample in the present study have not to date included any attempt at comparison with other populations. That is, there is no indication of whether these results are 'typical' in terms of levels of functioning of hospitalised mentally deficient patients of similar age.

Accompanying the Primary Progress Assessment Chart is the Primary Progress Evaluation Index (P-P-E-1). The P-P-E-1 is a tool designed to allow such comparison mentioned above. It permits comparison of attainment levels on the P-PAC of individuals in a particular patient group with those of a sample population (156 severely mentally handicapped young children requiring hospital care) in which P-PAC attainment levels are considered to be representative of groups of patients of similar age and intelligence. From P-PAC assessments on the sample population, "average attainment levels" are obtained. These are shown on diagrams contained in the P-P-E-1 for ages 2 - 7.

The P-P-E-1 is used by shading in the number of P-PAC credits in each section (leaving no gaps) on the appropriate P-P-E-1 diagram for a patient. This shading (i.e. patient's P-PAC attainments) is then compared with the existing cross-matching (i.e. "average" attainments). Where shading and cross-hatching correspond, then the achievements of the particular child can be considered to be 'average'; if some cross-

hatching is not shaded over, achievements are 'below average'; if shading covers spaces not cross-hatched, achievements are 'above average'. Assessments at 6-monthly intervals are subsequently entered on the P-P-E-1, thus providing information about the progress of the individual child with that to be expected during certain intervals.

The P-P-E-1 is not suitable for use with the total research sample in the present study unfortunately. This is due to its relevance for the age range 2 - 8 years only, whereas the age range of the research sample is 5 - 20 years (mean age: 10 years). That the P-PAC was suitable, however, for the assessment of all patients in the research sample is therefore an indication that the research sample contains patients of below average attainments. A rough indication that this is so can be provided.

A picture of the P-PAC of the 'average' patient in experimental group I is previously presented and is repeated in Figure 46 (diagram 1). Reference to the diagrams of the P-P-E-1 shows that this P-PAC most closely resmebles that of the '2 year' PE1 diagram. This is shown in Diagram 2 (figure 46). Diagram 3 (Figure 46 shows the P-PAC of this group shaded on to this 2-year P-P-E-1 diagram. In the 'communication' and 'socialisation' quadrants the experimental group (E I) can be seen to be more or less 'average'; however, in the 'occupation' and 'self-help' quadrants, the group falls 'below average'. Thus, it can be suggested that the research sample of the present study is, in general, very much less able than the sample population from which the P-P-E-1 derived. The mean age of the research sample is 10 years. The 'mean' P-PAC is 'below average' on the 2 year P-P-E-1 diagram.

Diagram 4 (Figure 46) shows the mean P-PAC score of the experimental

group (E I) at Assessment 2 on the (2 years) P-P-E-1 diagram. Here it can be seen that the experimental group has, on the whole, an 'above average' attainment at this second assessment. While the age groups cannot be compared, the progress made by the experimental group during this interval (during Experiment I) is greater than that to be expected on the basis of the sample population's progress.

While these comparisons are of limited value, they serve to provide some indication of the functioning of the research sample at baseline, and of their subsequent progress, compared with another patient population.

Figures 47 and 48 show the completion of the P-P-E-1 in respect of Patients 33 and 05. P 33 was just over 4 years old at the start of the study and is therefore compared with the P-P-E-1 diagram for 4 years. He was not included in the initial research sample and was later included in experimental group II, as previously detailed. Looking at the completed P-P-E-1 at Assessment 1 reveals that, unlike the research sample as a whole, P 33 compares favourably with the sample population used. He can be considered to be 'average' in most areas of functioning - in the sections of 'eating', 'mobility', 'dressing', 'communication to', 'socialisation' and 'agility'. He is well 'above average' in the 'communication from' section, scoring on items up to level e. He is slightly 'below average' in the 'dexterity' section. As is clear from the diagram, he scores no items on the 'toilet and washing' section in which he could be expected to have attained 5 skills at this stage. P 33 was one patient who failed to improve in the area of toilet behaviour as a result of the toilet training programme. This failure is reflected in the P-P-E-1 diagrams of Assessments 2, 3 and 4. Although he shows progress on the P-PAC in excess of that to be expected according to the P-P-E-1 in

most other areas, the absence of toilet skills persists; and, on the P-P-E-1 of the fourth and final assessment, this deficiency is even more pronounced. Thus, this patient's P-P-E-1 is particularly interesting, and again raises the question of why some patients failed to respond to the toilet training programme despite (as the P-P-E-1 here shows) this being contrary to expectation, as in this case.

The P-P-E-1 of P 05 (Figure 48) contrasts with the one above being typical of the 'below average' functioning of patients in the research sample at the baseline assessment. This is clearly illustrated in the P-P-E-1 of Assessment 1 in which P 05 is 'below average' on all sections compared with a mentally deficient child of comparable C.A. within the sample population. By Assessment 2 (post-experimental assessment for this patient of experimental group I), there is considerable improvement and 'average' levels are achieved in the sections of 'mobility', 'toilet and washing' and 'communication to'. 'Eating' and 'dexterity' remain the only two sections in which a score well 'below average' is attained. By the fourth and final assessment, this patient compares fairly well with the expected attainment levels, and thus illustrates progress over the period of the study from an unsatisfactory level of functioning to a fairly satisfactory one for his C.A. in comparison with the levels expected.

This final section of the P-PAC results therefore comments upon some of the findings from conventional examination of this assessment tool. Such findings pertaining to individual patients provided useful information throughout the study about each patient's strengths and weaknesses, and areas of progress. Such information was used in the planning of the toilet training programme and in its adaptation to the individual patient. It aided isolation of appropriate reinforcers and selection of toilet equipment and suggested, for example how much verbal instruction could be comprehended by the patient or how much physical guidance might be required instead. Thus, in its designed method of application, the P-PAC data proved to be extremely valuable and useful.

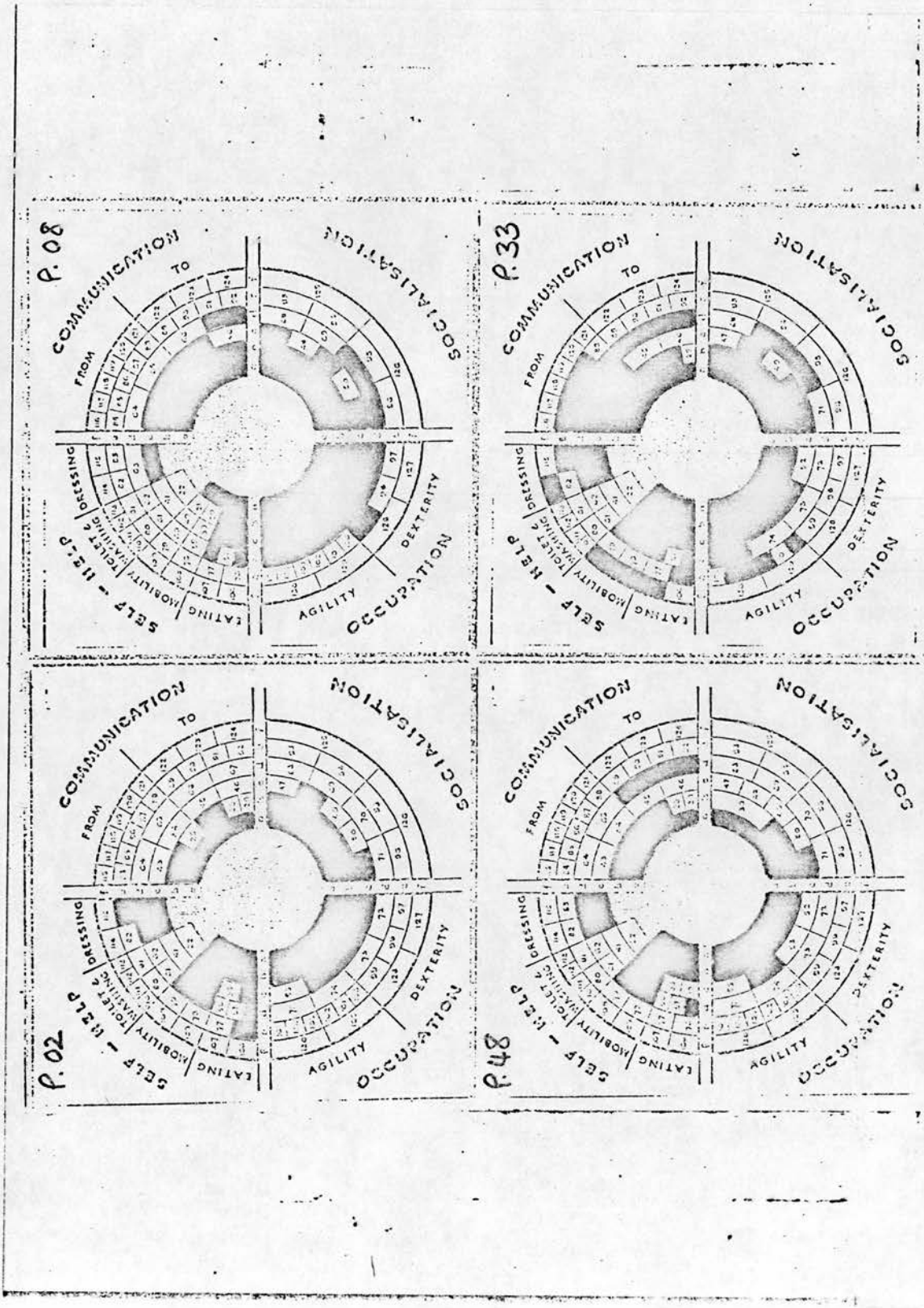



Figure 40 : Absence of skills in 'toilet and washing' section of P-PAC at Assessment I (Patients 02, 08, 48, 33).

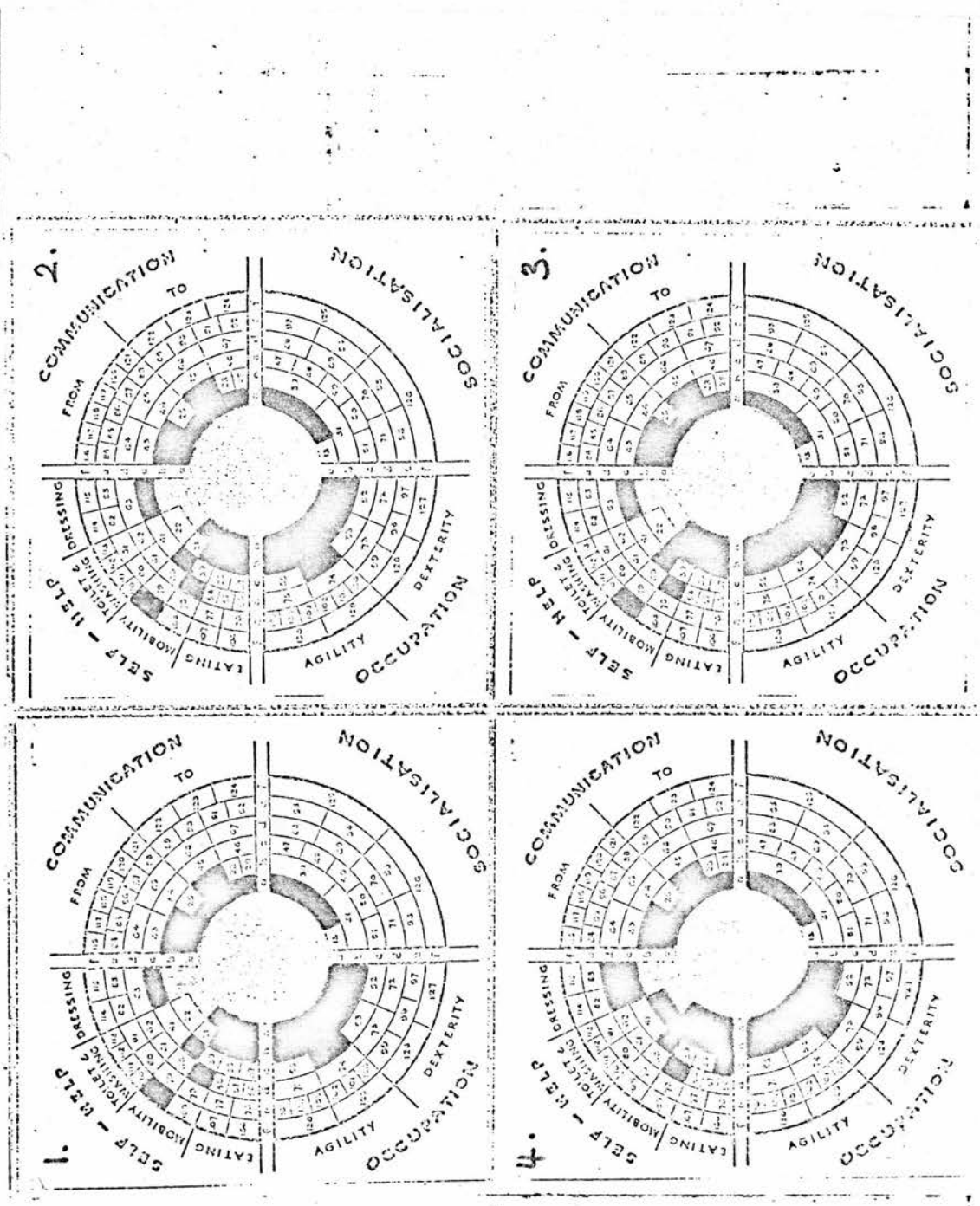



Figure 41 : P-PAC of Patient 29 at four Assessments.

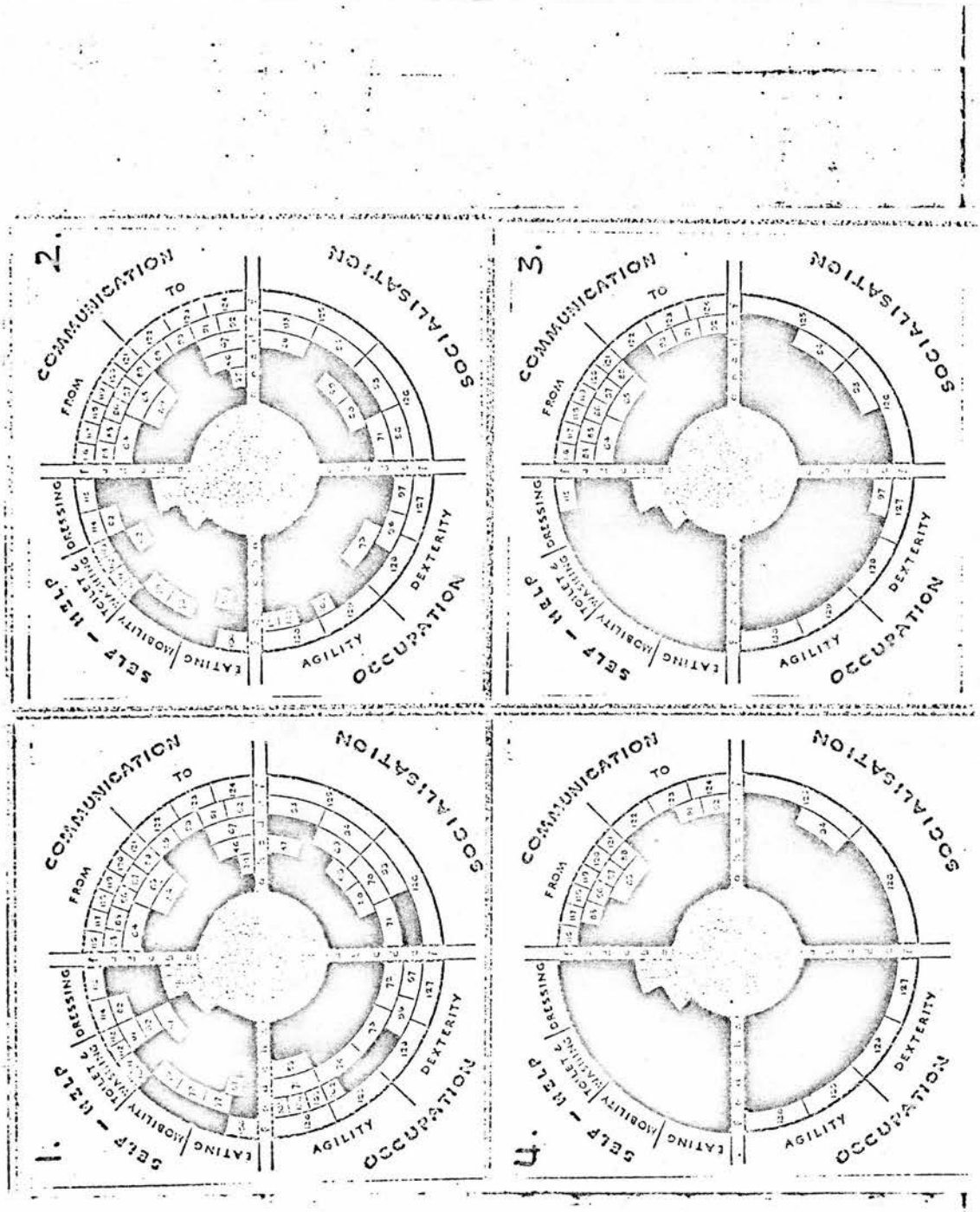



Figure 42 : P-PAC of Patient 32 at four Assessments

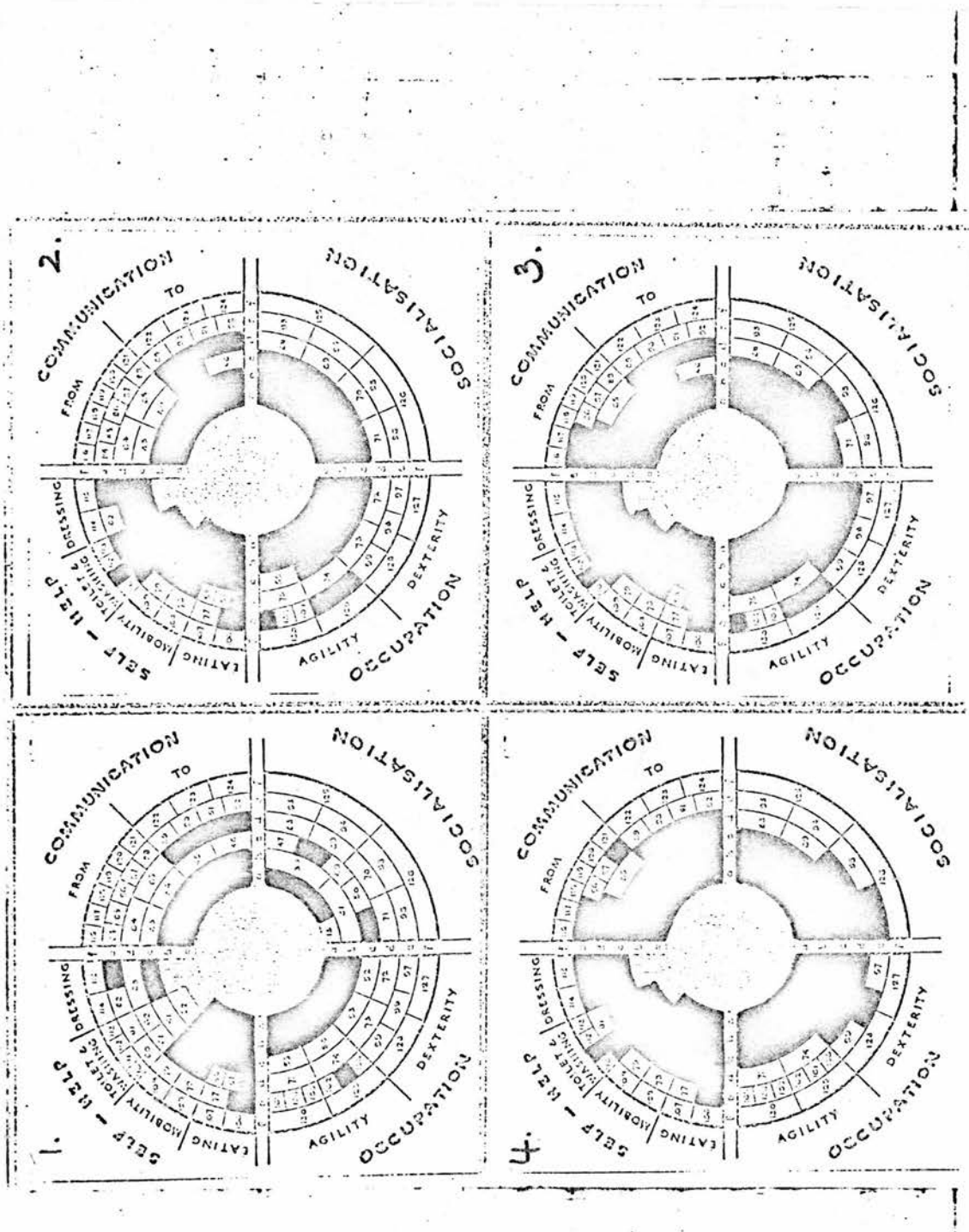



Figure 45 : P-PAC of Patient 26 at four Assessments

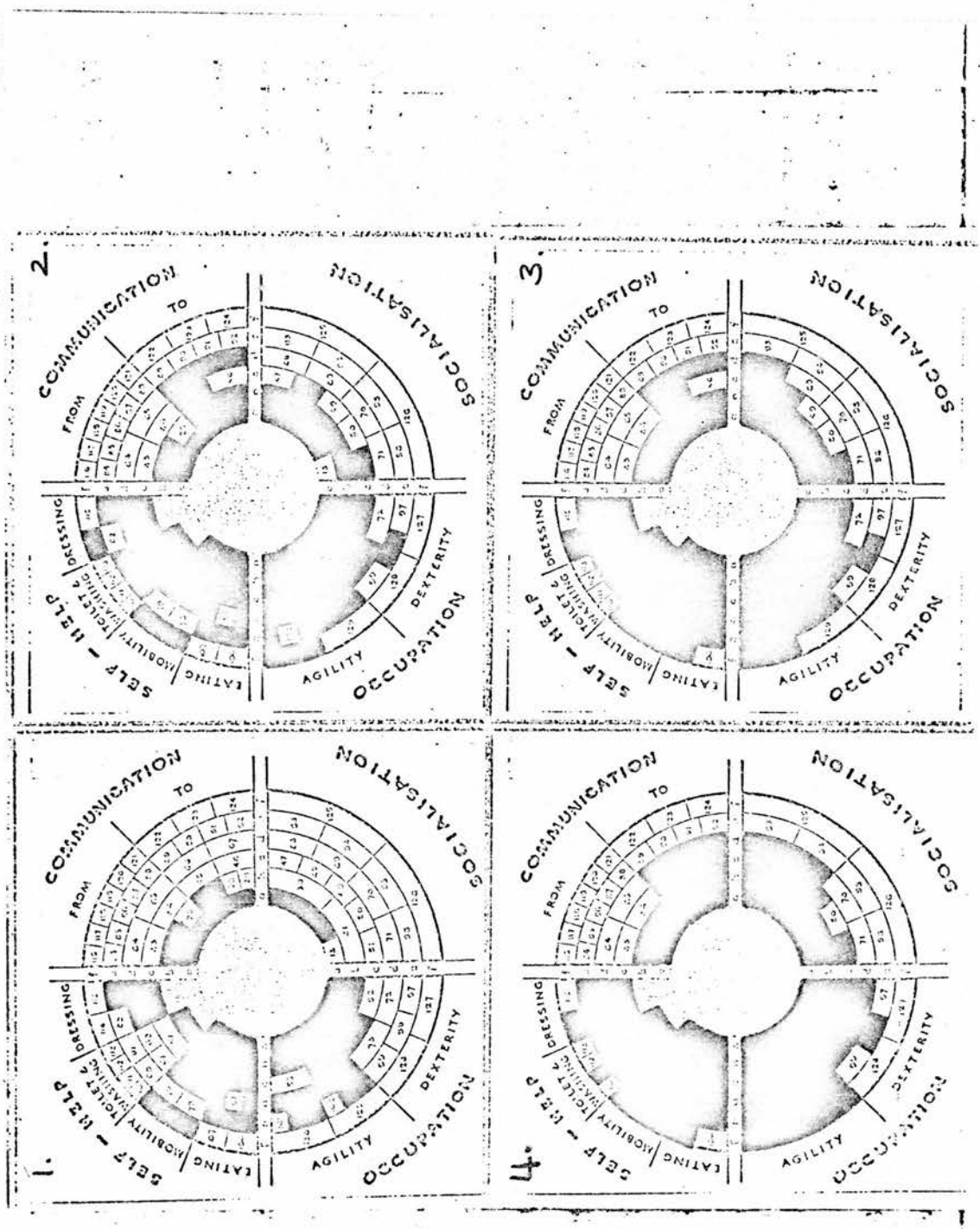



Figure 44 : Pattern D' evident in P-PAC of Patient 40

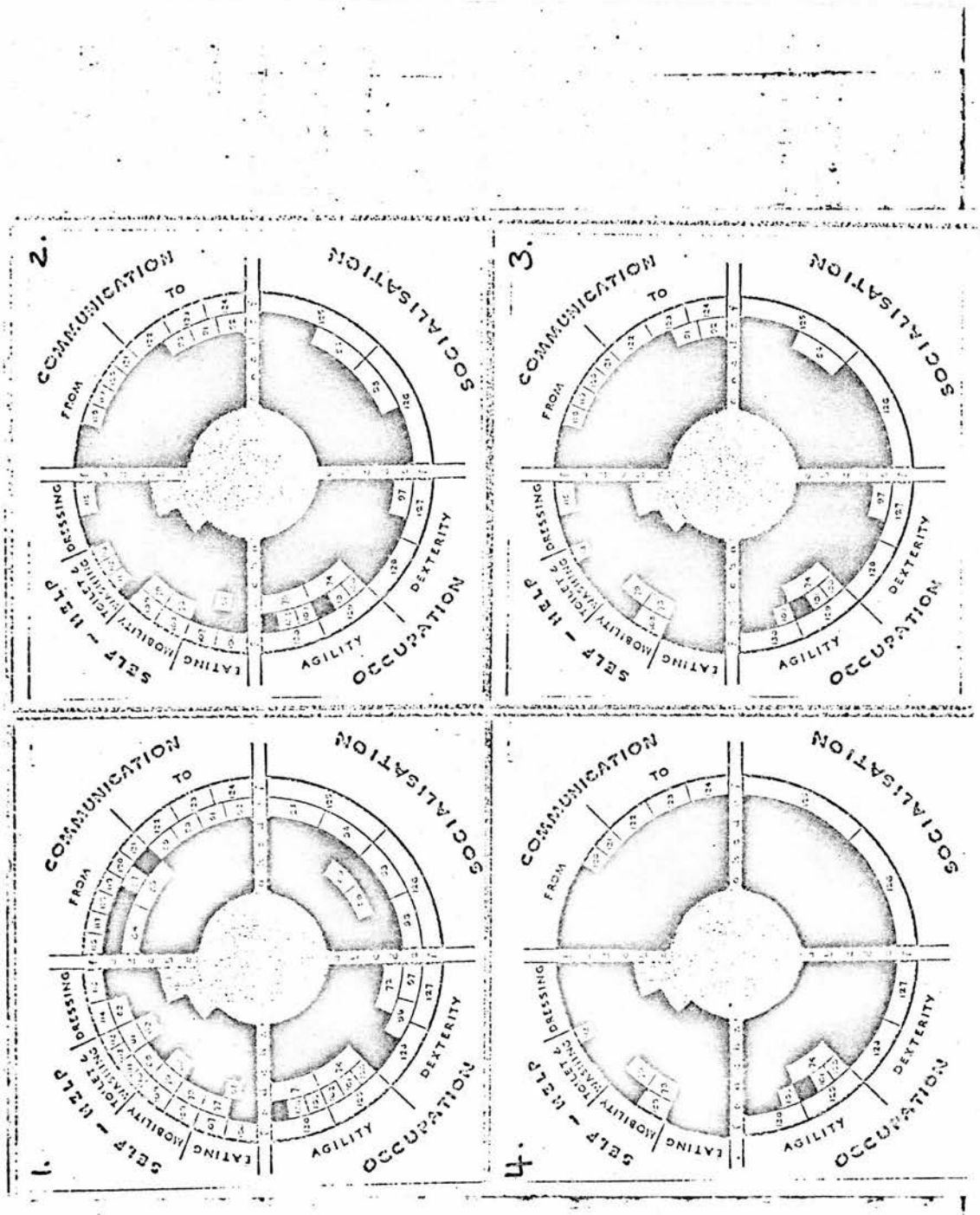



Figure 45 : Imbalance on P-PAC due to physical underdevelopment in Patient 52

Diagram 1 :

'Average' P-PAC of experimental group I (EI) at baseline.

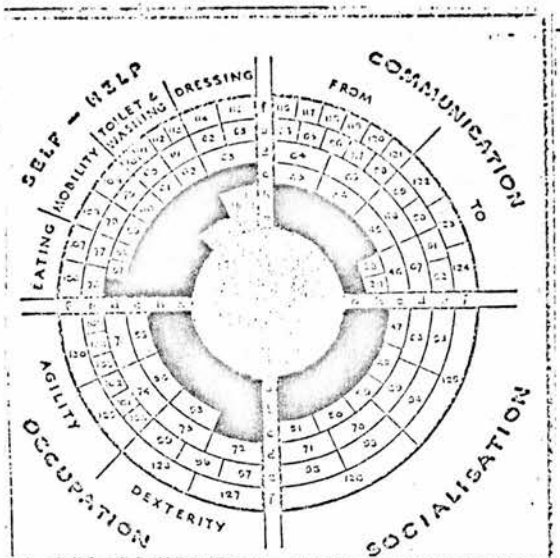
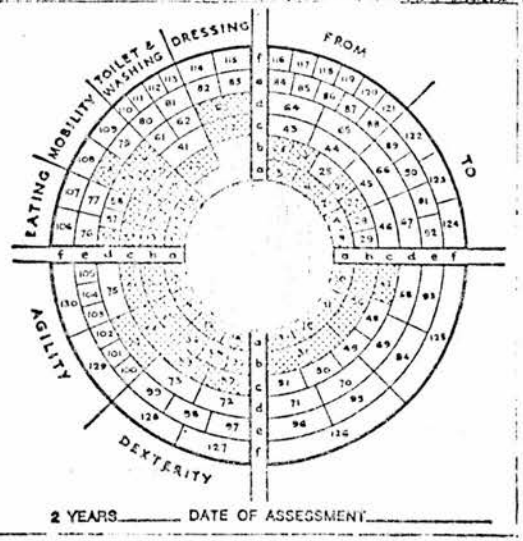



Diagram 2 :

P-P-E-I of 2 years.



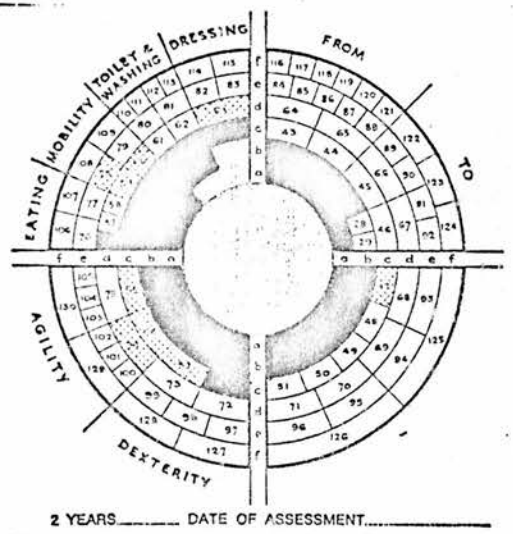




Diagram 3:

'Average' P-PAC (see Diagram 1) compared with P-P-E-I of 2 years (see Diagram 2 )

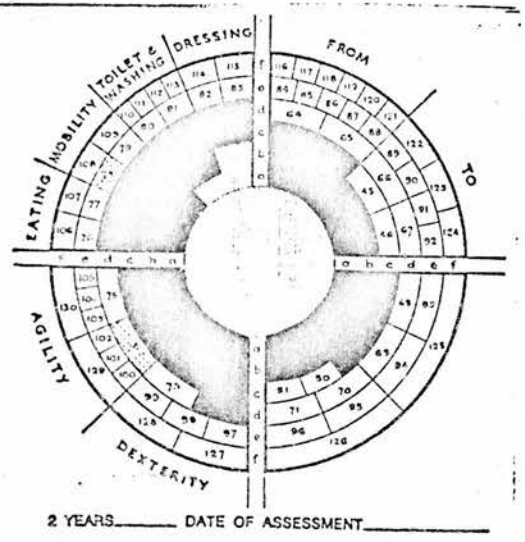
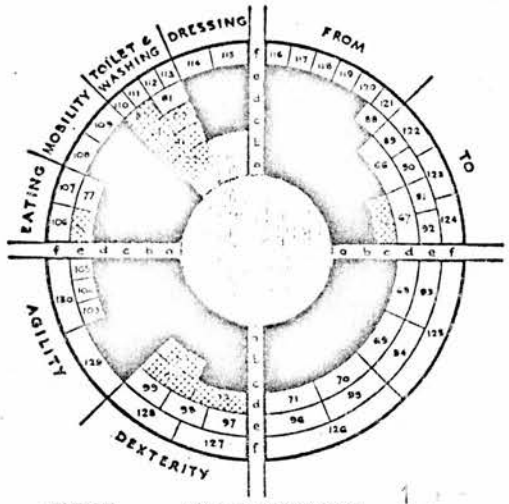



Diagram 4 :

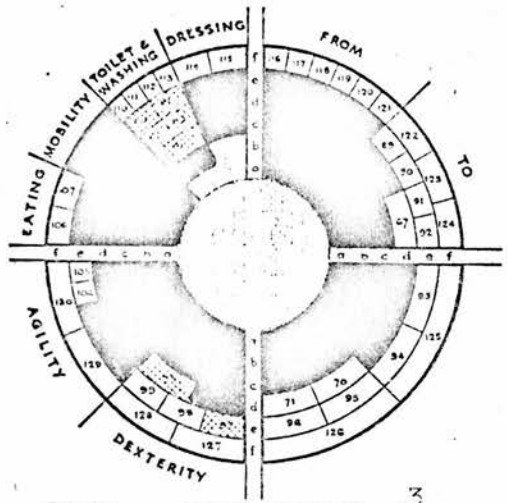
'Average' P-PAC of experimental group I (EI) at post-exp. assessment compared with P-P-E-I of 2 year

Figure 46 : Comparing P-PAC scores of experimental group I (EI) with the P-P-E-I.

First half-yearly assessment. (1 and 3).

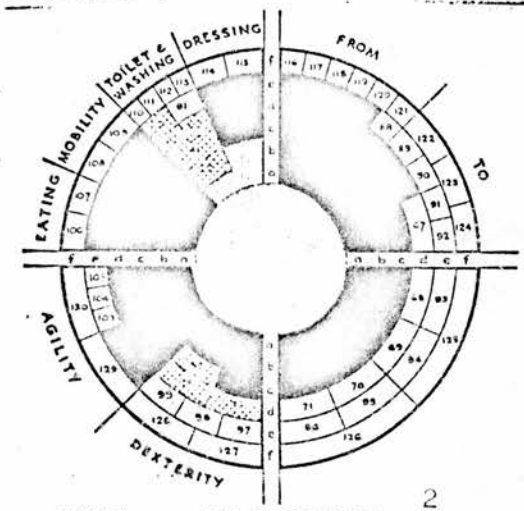



4 YEARS____ DATE OF ASSESSMENT____ 1

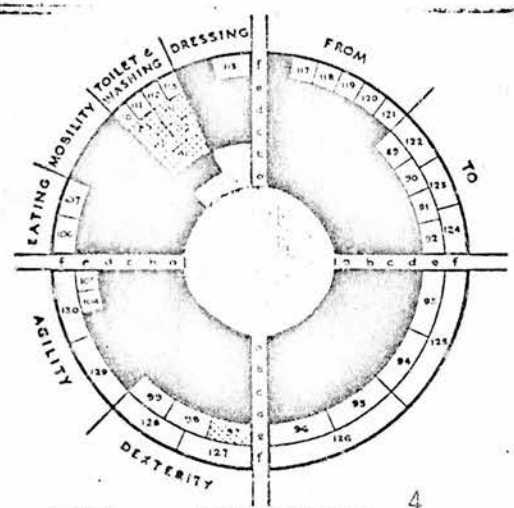



5 YEARS____ DATE OF ASSESSMENT____ 3

Second half-yearly assessment. (2 and 4).




4 YEARS____ DATE OF ASSESSMENT____ 2




5 YEARS____ DATE OF ASSESSMENT____ 4

Figure 47 : P-P-E-I of Patient 33 at four Assessments

First half-yearly assessment (1 and 3)

Second half-yearly assessment (2 and 4)

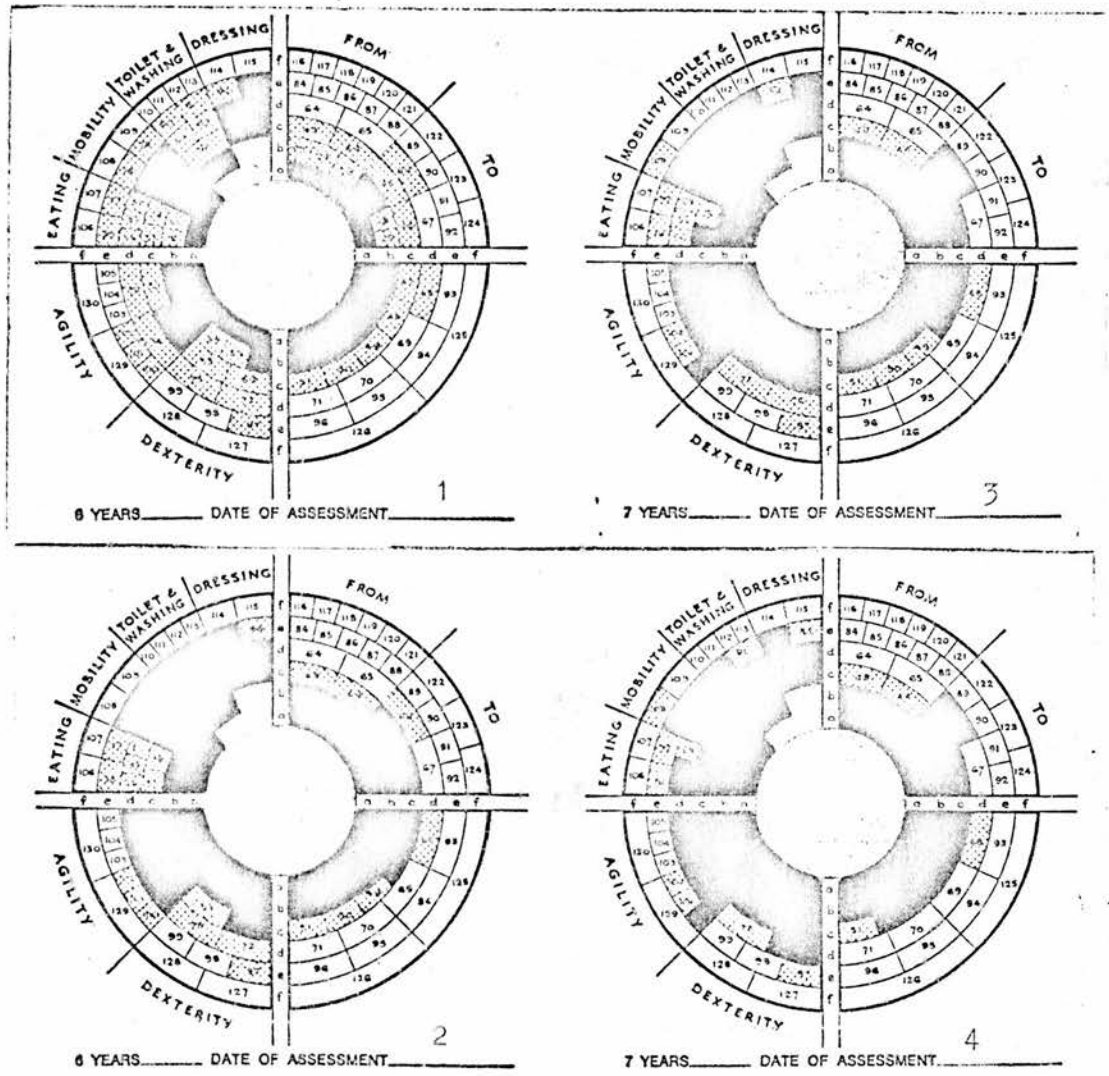



Figure 48 : P-P-E-I of Patient 05 at four Assessments.

3. Results pertaining to the total patient population.

The main body of results presented is concerned with the two experimental groups, and these together as the research sample. However, it is interesting to include a brief report of data which show the major changes in the experimental situation during the period of the study. Such data suggest the impact of this clinical study on its ward situation as a total community.

(i) Elimination response frequency:

The results from the two experiments of a decrease in the frequency of incontinent eliminations and an increase in the frequency of eliminations in the toilet (and overall increase in the total number of elimination responses) clearly influence the elimination response frequencies of the total patient population (N = 52) as a whole. This can be seen from Table 110 which details the numbers of all eliminations, incontinent eliminations and eliminations in the toilet. The trends are more clearly shown in the histogram of Figure 49. The number of incontinent eliminations in the total patient population is progressively reduced at each of the 4 assessments, from 5328 at Assessment 1 to 3372 at Assessment 4. These figures can be calculated also in terms of a reduction from 177.6 incontinent eliminations per day in the ward to 112.4 per day, or from an average of 3.41 per patient per day to 2.16 per patient per day. A clear overall indication of the reduction in ward incontinence is provided by the 27.98% reduction by the fourth assessment (from 53.87% of all eliminations being incontinent eliminations to 25.89%). Thus, while at the baseline recording (Assessment 1), more than half of the elimination responses are incontinent eliminations, at the final recording (Assessment 4) about one-quarter are incontinent eliminations.

Tables 111 and 112 identify data relating to the two groups in the research sample and those relating to patients of the total population not included in the sample. Thus, the overall reduction in ward incontinence shown above can be seen to be attributed largely to the experimental groups. However, there are changes within the other sub-groups of the total population which require to be noted. The reduction in the number of incontinent eliminations after the first experiment amounts to 892 responses (from 5328 to 4436). The reduction within the experimental group (E I) in fact exceeds this overall figure, being 1113 (from 2351 to 1238). The discrepancy arises from an increase in the number of incontinent eliminations within the control group (previously identified and discussed). There is also a reduction in incontinence within the group of 12 patients previously toilet trained by the ward nursing staff. This reduction occurs across the group. The smaller reduction in incontinence within the group of 4 patients specially excluded from the research sample is brought about by one patient in particular ( P 43). All sub-groups within the total population contribute to the increase in the total number of all eliminations at the post-experimental phase (Assessment 2), but the most substantial increase occurs in the experimental group. (See Table 111).

These results arise similarly in relation to Experiment II (see Table 112). The decrease of 1222 (from 2500 to 1278) in the number of incontinent eliminations in the experimental group (E II) exceeds the overall decrease of 866 in the total population. One difference is apparent between the results of the two experiments, this concerning patients outwith the research sample. In the second experiment there is a substantial increase in the number of incontinent eliminations (from 698 to 1236) and a small decrease in the number of eliminations

Table 110: Frequencies of elimination responses (incontinent eliminations and eliminations in the toilet) in the total population (n = 52) at 4 assessments (each as for 30 days)

| | Total number of all eliminations | Number of incontinent eliminations | Number of eliminations in the toilet | % of incontinent eliminations |
|---|---|---|---|---|
| Assessment 1 | 9890 | 5328 | 4562 | 53.87% |
| Assessment 2 | 11914 | 4436 | 7478 | 37.23% |
| Assessment 3 | 12744 | 3570 | 9174 | 28.01% |
| Assessment 4 | 13023 | 3372 | 9651 | 25.89% |

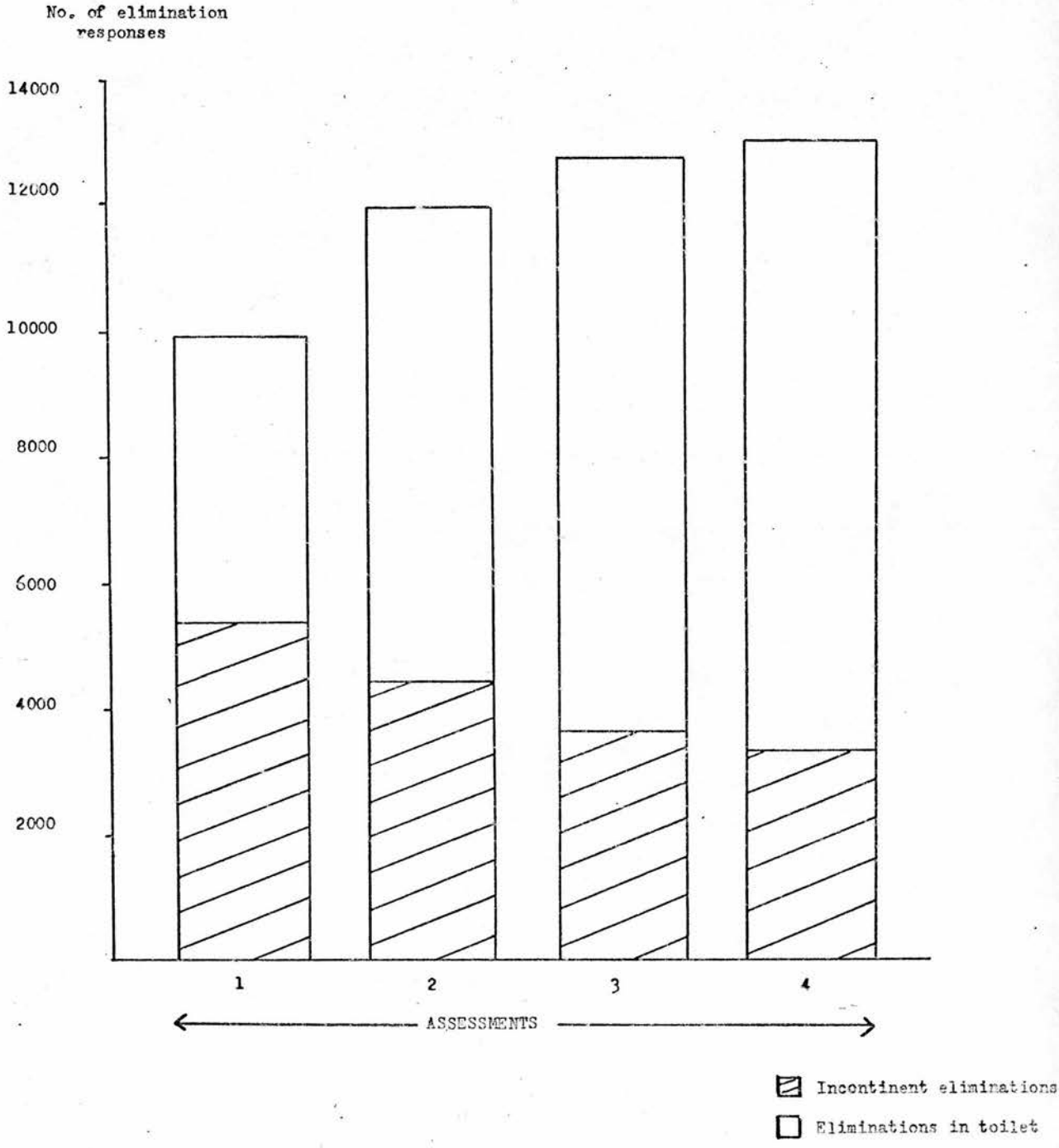



Figure 49 : Histogram showing total numbers of elimination responses (incontinent eliminations and eliminations in the toilet) in the total patient population at the 4 Assessments (each as for 30 days).

Table 111: Frequency of elimination responses (incontinent eliminations and eliminations in the toilet) in sub-groups of the total population at the pre-and post-experimental phases (Assessments 1 and 2) of Experiment I (as for 30 days)

| Sub-groups of total population | n | Total No. All eliminations | | Number of incontinent eliminations | | Number of eliminations in the toilet | |
|---|---|---|---|---|---|---|---|
| | | Pre-Exp | Post-Exp. | Pre-Exp. | Post-Ext. | Pre-Exp. | Post-Exp. |
| Experimental group (E I) | 18 | 3074 | 4796 | 2351 | 1238 | 723 | 3558 |
| Control group (C I) | 18 | 3134 | 3523 | 2279 | 2647 | 855 | 876 |
| 'Toilet trained' group | 12 | 2794 | 2763 | 148 | 62 | 2646 | 2701 |
| Other (excluded from research sample) | 4 | 888 | 832 | 550 | 489 | 338 | 343 |
| TOTAL POPULATION | 52 | 9890 | 11914 | 5328 | 4436 | 4562 | 7478 |

Table 112: Frequency of elimination responses in sub-groups of the total population (N = 52) at the pre- and post-experimental phases (Assessments 2 and 3) of Experiment II (as for 30 - day recording).

| Sub-groups of total population | n | Total No. All eliminations | | Number of incontinent eliminations | | Number of eliminations in the toilet. | |
|---|---|---|---|---|---|---|---|
| | | Pre-Exp | Post-Exp | Pre-Exp | Post-Exp | Pre-Exp. | Post-Exp. |
| Experimental Group 'II) (EII) | 17 | 3376 | 4518 | 2500 | 1278 | 876 | 3240 |
| Experimental Group I (E I) | 17* | 4796 | 4077 | 1238 | 1056 | 3558 | 3021 |
| Other patients | 18 | 3742 | 4149 | 698 | 1236 | 3044 | 2913 |
| TOTAL POPULATION | 52 | 11914 | 12744 | 4436 | 3570 | 7478 | 9174 |

* 17 because P 01 left ward.

in the toilet. Examination of raw data shows this to be brought about by the higher proportion of incontinent patients outwith the research sample by the third assessment. This is mainly due to the replacement of discharged continent patients by admitting patients who were incontinent.

(ii) Linen usage and use of nappies:

A reduction in linen usage in the ward due to patients' incontinence is identified in the results of Experiment I.

The number of items of linen used in the ward due to incontinence of patients (urinary and faecal) was recorded during the 30-day pre- and post-experimental phases. Table 113 shows the total number of items of linen used in the pre- and post-experimental phases. Appendix 1.6. contains the recording of the number of items on each day of the two phases and the mean number per patient per day.

There is a reduction by the post-experimental phase in the total number of items of linen used due to incontinence (from 9343 to 8274). This represents a reduction from a mean number of 311.43 per day in the pre-experimental phase to 275.80 per day in the post-experimental phase. The reduction is mainly attributed to that of linen used due to urinary incontinence (from 7618 to 6713), the reduction due to faecal incontinence being small(from 1725 to 1561). The overall reduction results is only a small reduction in the mean number of items used per patient per day.

Table 113: Number of items of linen used in Lewis Ward due to incontinence (urinary and faecal) during the pre-and post-experimental phases.

| | Pre-Exp. | | Post-Exp. | |
|---|---|---|---|---|
| | No. | Av/Day | No. | Av/Day |
| No. of items due to wetting | 7618 | 253.93 | 6713 | 223.76 |
| No. of items due to soiling | 1725 | 57.50 | 1561 | 52.03 |
| Total No. of items | 9348 | 311.43 | 8274 | 275.80 |

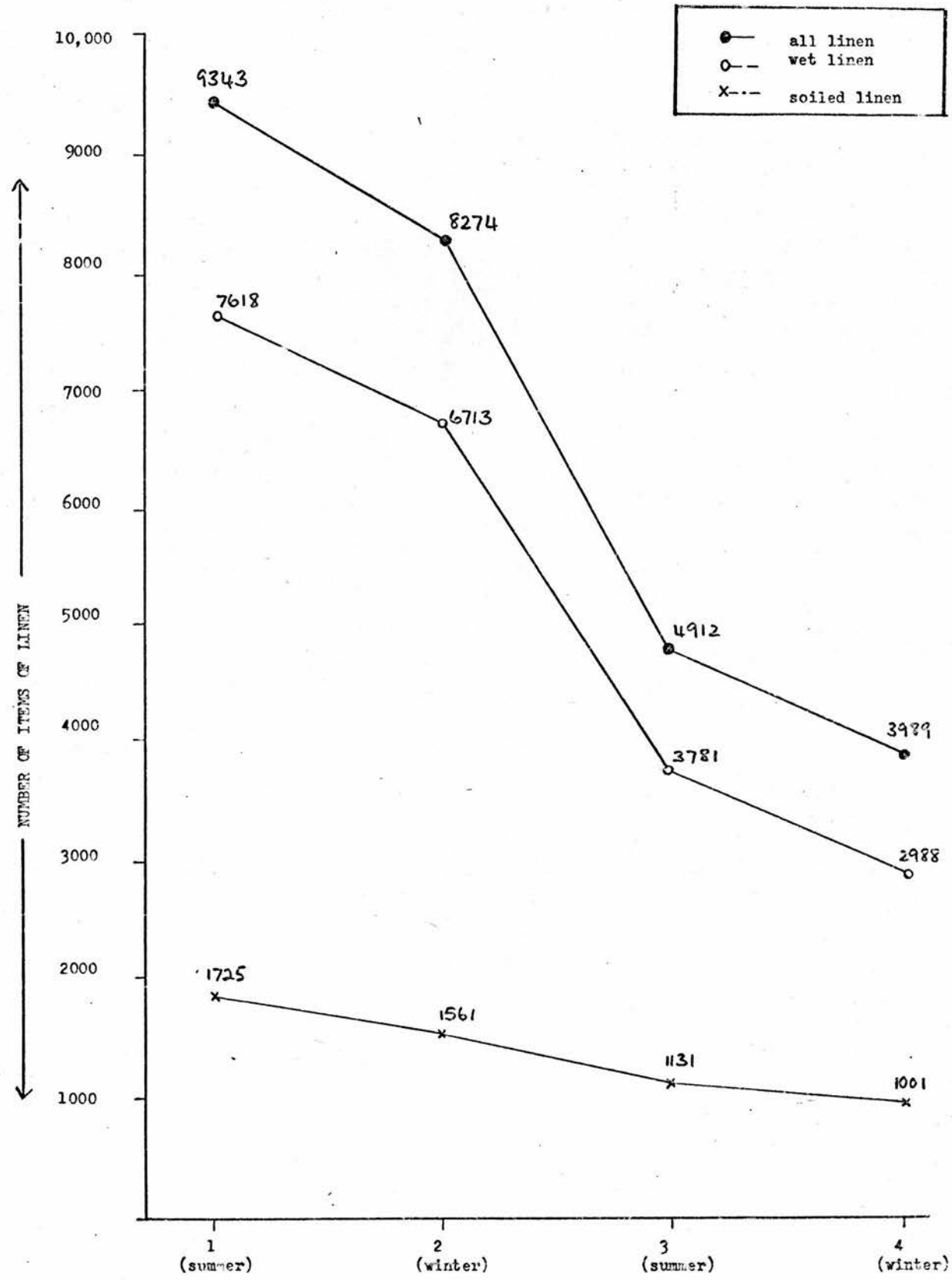



Figure 50 : Graph showing number of items of linen (all items, wet items, soiled items) used in ward at 4 assessments.

Figure 50 shows the numbers of items of linen used due to incontinence in the ward at the four assessments. The graph identifies numbers of all items, and also those items wet and those soiled. A decrease in relation to each can be seen at the assessments subsequent to the baseline recording (Assessment 1). The total number of items of linen used reduces from 9343 to 3989 by the final assessment. Linen used on account of urinary incontinence accounts both for the major linen usage and the majority of the decrease in all instances. What is perhaps most interesting is the greater decrease at the third assessment. It is earlier noted that the decrease as a result of the first experiment is small. Comparison of the decrease in frequency of incontinent eliminations and the decrease in linen used shows no direct relationship as might be expected. Explanation of this lack of relationship is offered in terms of the fluctuation in ward linen usage on account of the season of the year. The greatest decrease in linen usage occurs between the two assessments at which the second (Assessment 3) coincides with the summer season, this lending support to the explanation offered which was suggested to the researcher by the ward nursing staff. It is not felt that adopting linen usage as a dependent variable for measuring the effect of toilet training provides a particularly sensitive measure.

The use of nappies presents a further confounding influence on the reliability of measuring linen usage and using such measurements to show the effect of the toilet training experiments. However, the decrease in the number of patients in the total population who are maintained in nappies by the final assessment of the study provides a further indicator of a major change in the experimental situation. Table 114 shows the number of patients maintained in nappies.

Table 114: Number of patients and percentage of the total population (N = 52) maintained in nappies at the 4 assessments.

| | n | % |
|---|---|---|
| Assessment 1 | 34 | 65.38 |
| Assessment 2 | 20 | 34.46 |
| Assessment 3 | 15 | 28.84 |
| Assessment 4 | 7 | 13.46 |

Thus, while 34 patients (65.38% of total population) were maintained in nappies at the baseline recording, this number is reduced to 7 patients at the final assessment in the study. This represents the previously common practice being applied to only 13.46% of the population at this time. (The reduction is not due entirely to the two experiments alone).

(iii) The 'profile' of the ward in terms of incontinence:

Using the 'percentage degree of incontinence' measurement, a profile of the ward in terms of incontinence can be provided. Figure 51 shows this profile at the 4 assessments and the changes in it on account of the changed distribution of patients in the total population by degree of incontinence. There is a clear redistribution of patients, transfer taking place across the histograms from the highest percentile degrees of incontinence to the lower degrees. The reduction in numbers of patients falling in the 90 - 100% degree of incontinence percentile is marked and, by the fourth assessment, is at its lowest with only 5 patients. The increase in numbers within the 0 - 9% percentile is also obvious, the highest number reached being 22 at the third assessment.

It is therefore seen that there is a dramatic change in the profile of Lewis Ward in terms of the patients' degree of incontinence

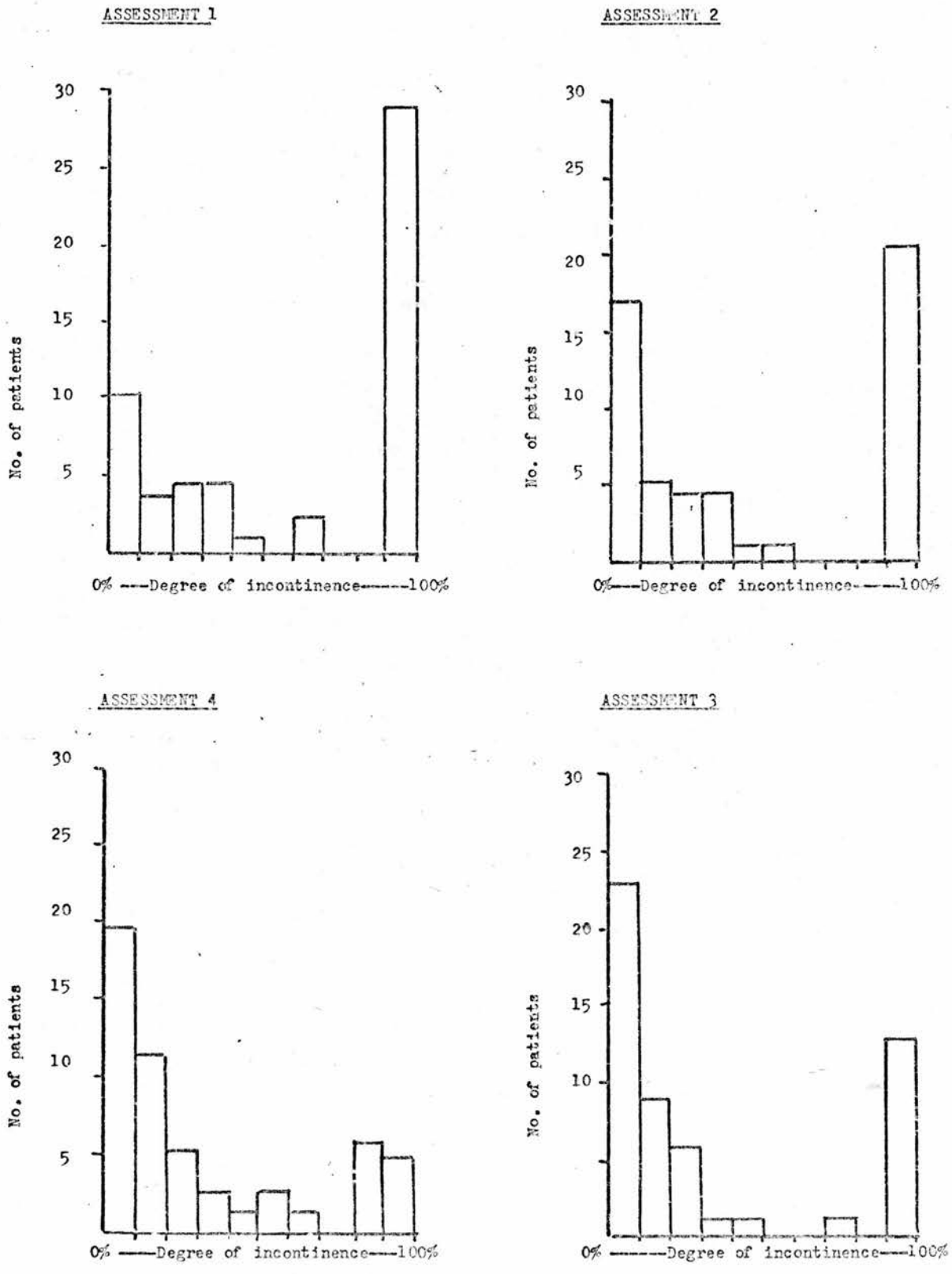



Figure 51 : Profile of ward incontinence at four assessments: Distribution of patients in the total population (N=52) by percentile degree of incontinence.

during the period of the study.

Appendix 2 contains the % degree of incontinence of all 59 patients involved in the study at all (or some) of the 4 assessments.

4. Results pertaining to patients who show no/minimal improvement as a result of toilet training.

In Experiment I, 4 patients (Ps 36, 44, 27 and 02) did not show any reduction in the degree of incontinence and showed no (or minimal) improvement in toilet behaviour as a result of the experimental toilet training programme. Similar results pertain to 4 patients (Ps 17, 16, 29, 33) in Experiment II. 8 patients are, therefore, categorised as those who show minimal improvement as a result of toilet training. This represents 22.85% of the research sample involved (n = 35) in the two experiments.

Firstly, a summary of those improvements or changes occuring during the experimental phase is provided: (reduction in degree of incontinence, improvement in toilet behaviour, gains in P-PAC scores). Secondly, comparison of these patients (n = 8) with the remainder of the experimental research sample (n = 27) is presented in terms of initial patient characteristics (C.A., M.A., sex, length of hospitalisation, diagnosis, degree of deficiency, epilepsy, initial toilet status, mobility status, sensory deficits, baseline P-PAC scores).

(1) Improvements/changes occuring during the experimental phase:

(i) Reduction in degree of incontinence:-

Table 115 contains the % degree of incontinence of these 8 patients at the 4 assessments. All 8 patients were totally incontinent (97 - 100%) at the baseline recording (Assessment 1). At the post-experimental

recording (Assessment 2 for patients in Experimental Group I and Assessment 3 for patients in Experimental group II), 7 patients remain totally incontinent (i.e. within the highest percentile, 90 - 100%), and only 1 (P33) shows some reduction (11%) in his degree of incontinence. The mean reduction in the 4 cases where reduction occurs is 5.55%. This can be compared with the reduction in Experiment I ranging from 18% - 89%, and in Experiment II from 28% - 88%.

Some reduction in the degree of incontinence in all but 2 (Ps 27 and 16) of these 'non-improved' patients is, however, evident at the long-term evaluation of the study (i.e. Assessment 4) (see Table 115).

(ii) Improvement in toilet behaviour:-

The number of target behaviours (on the model of shaping toilet behaviour) established in the 'non-improved' patients at the 4 assessments is shown in Table 116. None of these patients had any established toilet behaviour at the baseline assessment (Assessment 1). At the post-experimental assessments, all patients had established at least one target behaviour, the maximum number established being three. This compares with a mean number of 8.94 established in experimental group I at the end of Experiment I and a mean of 8.47 in experimental group II at the end of Experiment II.

Some further acquisition of targets is evident in 6 patients at Assessment 4. P 33 shows the greatest improvement (gain of 5 targets) at this stage, with a total of 8 target behaviours established. This includes reaching the second intermediate target level in the areas of 'sitting' and 'dressing'. All other patients remain at the level of base targets in each area.

(iii) Improvement in general level of functioning:-

Table 117 contains the score on the total P-PAC for each of the 8 patients at the 4 assessments. With the exception of 1 patient (29), there is improvement in the general level of functioning (as assessed on the Primary-Progress Assessment Chart) throughout the period of the study. In results on the P-PAC pertaining to the research sample as a whole it is shown that, in the majority of cases, the period of greatest improvement (i.e. highest gain) coincides with the experimental phase. This phenonomen does not occur in relation to the 'non-improved' group except in three (Ps 36, 27 and 33) of the 8 cases.

Comparison of the scores on the total P-PAC of the two experimental groups with this 'non-improved' group shows a lesser degree of improvement post-experimentally occuring in the 'non-improved' group. The mean gain during the experimental phase within experimental groups I and II is 18.05% and 15.18% respectively. Within the non-improved group, however, the mean gain is much lower at only 6.87% It is relevant to note that the mean pre-experimental score of this group is the lowest among the three groups identified. (See Table 118)

(2) Comparison of initial patient characteristics of 'non-improved' group of patients (n = 8) with those of the remainder of the experimental research sample (n = 27):

It is not intended to present an exhaustive analysis or to compare statistically the similarities and differences of these two groups of patients - those who improved in terms of toilet training and those who did not. The author offers no hypothesis of the possible reasons for the failure of 8 patients and there are many possibilities which would require to be followed up in an attempt

Table 115: Degree of incontinence of 'non-improved' patients (n = 8) at 4 assessments.

| | | Assessments → | | | |
|---|---|---|---|---|---|
| Patient | Group | 1 | 2 | 3 | 4 |
| 36 | E I | 97 | 100* | 100 | 90 |
| 44 | E I | 98 | 93* | 100 | 82 |
| 27 | E I | 97 | 99* | 100 | 100 |
| 02 | E I | 100 | 98* | 100 | 85 |
| 17 | E II | 100 | 100 | 100* | 89 |
| 16 | E II | 97 | 100 | 100* | 98 |
| 29 | E II | 98 | 100 | 96* | 90 |
| 33 | E II | 98 | 100 | 89* | 86 |

* Post-Experimental degree.

Table 116: Number of toilet behaviour targets established in 'non-improved' patients (n = 18) at 4 assessments.

| | | Assessments → | | | |
|---|---|---|---|---|---|
| Patient | Group | 1 | 2 | 3 | 4 |
| 36 | E I | 0 | 3* | 3 | 4 |
| 44 | E I | 0 | 3* | 3 | 4 |
| 27 | E I | 0 | 3* | 0 | 0 |
| 02 | E I | 0 | 3* | 3 | 4 |
| 17 | E II | 0 | 0 | 1* | 4 |
| 16 | E II | 0 | 0 | 1* | 0 |
| 29 | E II | 0 | 0 | 3* | 4 |
| 33 | E II | 0 | 0 | 3* | 8 |

* Post-Experimental degree.

Table 117: Scores on total P-PAC of 'non-improved' patients at 4 assessments.

| | | Assessments ⟶ | | | |
|---|---|---|---|---|---|
| Patient | Group | 1 | 2 | 3 | 4 |
| 36 | E I | 25 | 37* | 39 | 45 |
| 44 | E I | 32 | 38* | 42 | 48 |
| 27 | E I | 26 | 36* | 39 | 43 |
| 02 | E I | 46 | 51* | 50 | 57 |
| 17 | E II | 27 | 29 | 35* | 44 |
| 16 | E II | 25 | 24 | 30* | 36 |
| 29 | E II | 33 | 33 | 34* | 37 |
| 33 | E II | 73 | 76 | 85* | 92 |

* Post-Experimental

Table 118: Gains in total P-PAC scores during experimental phases by experimental group I (n = 18), experimental group II (n = 17) and 'non-improved' group (n = 8).

| Group | n | Mean Pre-Exp. score | Mean Post-Exp. score | Mean Exp. Gain. |
|---|---|---|---|---|
| Experiment I | 18 | 41.61 | 59.67 | 18.05 |
| Experiment II | 17 | 52.88 | 68.05 | 15.18 |
| 'non-improved' | 8 | 36.37 | 43.25 | 6.87 |

to conclude a causal influence on failure. It suffices here to return to the measures obtained on patients at the selection procedure and to compare the characteristics of these two groups of patients at baseline assessment. Comparison is made in relation to 11 variables.

(i) Chronological age:

The range of C.A. in the 'non-improved' group of 8 patients is 6 - 15 years, with a mean age of 9.75 years. The mean age is very similar to that of the 'improved' group (10.00 years). There is a wider range of C.A. in this larger group, being 5 - 20 years.

(ii) Mental age:

Within the 'non-improved' group, the M.A. ranges from untestable (2 patients) to a maximum of 17.2 months (P33). The mean M.A. is 9.25 months. Comparing these results with those of the 'improved' group shows that the mean M.A. is lower and the range narrower. The mean M.A. of the 'improved' group is 11.83 months. The range is from untestable (4 patients) to 22.6 months.

(iii) Sex:

The distribution of males and females within the experimental research sample is not even, with a total of 30 males and 5 females: (i.e. ratio of 6:1). When the two groups are considered separately, it is seen that there results a higher male: female ratio (7:1) in the 'non-improved' group than in the 'improved' group (4.4:1).

(iv) Length of hospitalisation:

Patients in the 'non-improved' group have been in hospital for between 2 and 5 years, the mean length of hospitalisation being 4.25years. Three-quarters of this group has been hospitalised for 5 years. In the 'improved' group, the mean length of hospitalisation is very similar at 4.85 years. The range of length, however, shows greater variation. The range for this group is 1 - 14 years.

(v) Diagnosis:

A formal diagnosis is not available in over one-half of the patients included in the total research sample and, therefore, results are incomplete and comparisons difficult to draw. It is interesting, however, that within the 'non-improved' group there is only one patient (P 36) with a formal diagnosis (this being encephalitis). Within the 'improved' group a diagnosis is available in two-thirds of the cases. These contain a variety of diagnosis, both those involving known genetic abnormalities and those without such abnormalities. Mongolism accounts for the single most common diagnosis within the total sample and all of the mongols (6 cases) fall into the 'improved' group.

(vi) Degree of deficiency:

100% of the 'non-improved' group is classified as low-grade defective. There is therefore a marked difference between this group and the 'improved' group on this variable. 70.37% of the 'improved' group is classified as low-grade and the remaining 29.62% as medium grade.

(vii) Epilepsy:

All 8 patients in the 'non-improved' group suffer from epilepsy and are diagnosed as known epileptics. All suffer from grand mal epilepsy, all suffered epileptic attacks during the pre-experimental phase of the present study, and 2 of these patients (P 17 and P 33) are considered to be severe epileptics. Three episodes of status epilepticus have occured during P 33's two years of hospitalisation. In contrast, less than half (44.44%) of the 'improved' group are epileptics and more than half of these (7 patients) had no attack during the pre-experimental recording phase.

(viii) Toilet Status:

10 patients were grouped at selection under status group 2, these being those currently being potty trained by the nursing staff. All of these patients are contained in the 'improved' group. The 'non-improved' group therefore exclusively contains patients assigned to toilet status group 3 (i.e. "incontinent") at selection.

(ix) Mobility:

Two patients (25%) of the 'non-improved' group are fully mobile. The remaining six patients (75%) are not fully mobile; five of these (62.50%) had limited mobility at selection and the remaining one (12.50%) was completely immobile. There is a much lower prevalence of limited mobility and immobility in the 'improved' group at the selection stage of the study. 25.92% of this group (7 patients) has limited mobility and 14.81% (4 patients) is described as immobile. The remaining 16 patients (59.25% of the group) have full mobility.

(x) Sensory deficits:

The incidence of sensory deficit within the total research sample is small, only 3 patients suffering visual incapacity. 2 of these (P 19 and 28) are contained in the 'improved' group and the other (P 29) in the 'non-improved' group.

(xi) General level of functioning:

The mean scores of the 'non-improved' group on the total P-PAC and each of the four quadrants ('self-help', 'communication', 'socialisation' and 'occupation') are all, without exception, lower than those of the 'improved' group. The mean score of the 'non-improved' group on the total P-PAC is 35.50, 11.38 less than that of the 'improved' group's mean score of 46.88. On the 'self-help' quadrant, the 'non-improved' group obtains a mean of 13.87, and the 'improved' group a mean of 16.85. Scores of the former group range from 10 - 24, and

those of the latter group from 10 - 26, showing minimal difference in this respect. On the 'communication' quadrant, similar results are obtained. The 'non-improved' group displays a range of scores from 2 - 21 and a mean score of 9.37; the range within the 'improved' group is similar ( 6 - 21) and the mean score higher (11.11). In the 'socialisation' and 'occupation' quadrants, the 'improved ' group has means of 6.85 and 12.07 and the 'non-improved' group has means of 4.37 and 7.87, respectively. In both cases, the upper limit of the range of scores is higher in the 'improved' group (socialisation: 2 - 17 and communication 5 - 24) than in the 'non-improved' group (socialisation: 1-11 and communication 2 - 17). Overall, on the total P-PAC, the range of scores within the two groups is similar (25 - 86 in the 'improved' group and 24 - 73 in the 'non-improved' group).

From this cursory comparison of these two groups, the following observations are made:-

(1) There is no (or minimal) difference between that group of patients which improved in toilet training and that which did not improve in respect of C.A., M.A. , length of hospitalisation, and incidence of sensory incapacity.

(2) Within the 'improved' group is a higher proportion of female patients, a greater number of patients with firm diagnosis, a lower incidence of patients with previous toilet training, a lower prevalence of impaired mobility, and a higher general level of functioning.

(3) Within the 'non-improved' group, there is a higher prevalence of low-grade deficiency, epilepsy and impaired mobility and lower general level of functioning.

5. Acquisition of continence and toilet behaviour.

Results are presented here of some findings which are relevant to report from analysis of data obtained during the experimental phase from (a) the model of shaping toilet behaviour and (b) the cumulative records of response rates. Data are drawn mainly from Experiment I.

1. Acquisition and establishment of target behaviours on the model of shaping toilet behaviour :

Results are previously provided of those targets established at the end of Experiments I and II (and subsequent assessments).

Analysis undertaken here provides findings on the rate of acquisition of those targets established during the 90-day period of Experiment I. Examination of the completed models for the 18 patients in experimental group I basically shows that there is much variation in the rate of acquisition of these behavioural targets amongst the patients. Table 119 contains the number of days taken by each patient to acquire those targets established. The mean number of days per target per patient is included therein. Having concluded that no standardisation is apparent within the group, some features observed are noted. Figure 52 shows the mean number of days taken to acquire targets 1 - 16 by the group as a whole. The mean number of days per target within each of the 4 areas of the model is shown in brackets.

In the 'eliminating' area (targets1 - 4), the targets are acquired in mean times of 31.11, 30.00, 27.50 and 18.57 days respectively. Within that group of patients with no previously established 'eliminating' targets (Ps 26 - 45 incl. as ordered), three patients (Ps 28, 45 and 18) acquire target 1 quickly (i.e. 20 days or less) while the remaining six patients (Ps 26, 22, 19, 04, 10, 48) take much longer (i.e. 40 days). However, the rate of acquisition

Table 119 : Number of days taken to acquire targets established during Experiment I by patients in experimental group I.

| PATIENTS | TARGET BEHAVIOURS ← 'ELIMINATING' | | | | 'SITTING' | | | | 'DRESSING' | | | | 'GOING' → | | | | MEAN TIME PER TARGET |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | |
| 53 | * | * | 10 | 40 | * | * | 30 | 40 | * | 20 | 30 | | * | 30 | 30 | | 28·75 |
| 40 | * | * | 60 | 20 | * | 20 | 20 | 20 | * | 20 | 40 | | * | 60 | | | 32·50 |
| 49 | * | * | 30 | 20 | 10 | 10 | 20 | 10 | * | 20 | 20 | 20 | * | 40 | | | 20·00 |
| 01 | * | 30 | 50 | | * | 20 | 60 | 10 | * | 30 | 30 | | * | 70 | | | 37·50 |
| 05 | * | 30 | 50 | | * | 20 | 70 | | * | 80 | | | * | | | | 50·00 |
| 26 | 40 | 30 | 10 | 10 | 20 | 20 | 20 | 30 | 20 | 60 | | | 20 | | | | 25·45 |
| 22 | 40 | 30 | 10 | 10 | 40 | 20 | 20 | | 20 | 60 | | | 20 | 60 | | | 30·00 |
| 19 | 40 | 30 | 10 | | 30 | 10 | 20 | | 20 | 40 | | | 30 | | | | 25·55 |
| 18 | 20 | 40 | 20 | 10 | 20 | 20 | 20 | 20 | 20 | | | | 20 | | | | 21·00 |
| 28 | 10 | 10 | 40 | 20 | 10 | 10 | 10 | 10 | 10 | 50 | | | 10 | 50 | | | 20·00 |
| 04 | 40 | 30 | 20 | | 20 | 10 | 10 | 10 | 20 | 10 | 10 | | 20 | 30 | | | 19·16 |
| 10 | 40 | 30 | 20 | | 10 | 10 | 10 | | 20 | | | | 20 | | | | 20·00 |
| 48 | 40 | 30 | | | 20 | 10 | 10 | | 20 | | | | 20 | | | | 21·42 |
| 45 | 10 | 40 | | | 20 | 10 | 10 | | 20 | | | | 20 | | | | 18·57 |
| 36 | | | | | 40 | | | | 40 | | | | 20 | | | | 33·33 |
| 44 | | | | | 60 | | | | 40 | | | | 30 | | | | 43·33 |
| 27 | | | | | 20 | | | | 20 | | | | 20 | | | | 20·00 |
| 02 | | | | | 40 | | | | 20 | | | | 20 | | | | 26·66 |

* ESTABLISHED PRIOR TO PROGRAMME

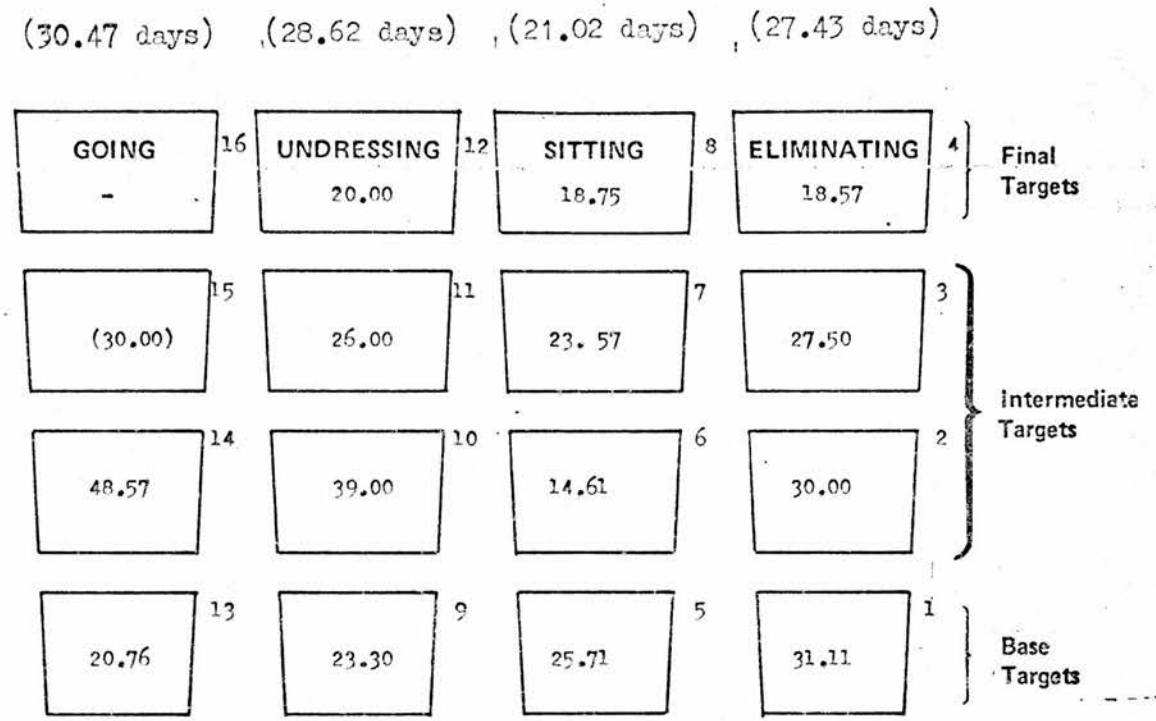



Figure 52 : Mean number of days taken to acquire targets and areas on the shaping model by experimental group I (EI).

of this base target does not apparently dictate the subsequent rate of acquisition. With the exception of 1 patient (P 53), those patients with previously established 'eliminating' targets appear to show a slow acquisition rate during the experimental phase. The mean time taken by this group of five patients (Ps 53, 40, 49, 01 and 05) on target 3 is 40.00 days and, on target 4, is 26.66 days. In both cases, this is longer than the mean times of the total experimental group. Within the group of nine patients (Ps 26, 22, 19, 18, 28, 04, 10, 48, 45) who have no previously established 'eliminating' targets, target 3 is acquired in a mean time of 18.57 days and target 4 in 12.50 days.

Within the 'sitting' area of the model, the overall mean rate of acquisition per target is the highest at 21.02 days. Of those 14 patients who establish at least up to target 7, three patients (Ps 53, 28, and 10) do so in 30 days and four more patients (Ps 40, 49, 48, 45) do so in 40 days. These patients show a fast rate of acquisition in the area of 'sitting' behaviour and, unlike the 'eliminating' area, the rate of acquisition appears to be more consistent. Two patients (P 01 and 05) are slow to acquire target 7 ("is helped to sit down on the toilet and sits unrestrained") which involves the withdrawal of physical guidance and relies on verbal prompting. P 01, however, subsequently acquires target 8 ("sits down on the toilet independently" ) very quickly. P 22 presented the greatest problem in terms of shaping sitting behaviour. He is severely spastic and, in the initial stages of the experimental phase, resisted being sat on the potty by becoming rigid and screaming. Having taken almost half of the period of the experimental phase to acquire target 5, targets 6 and 7 were subsequently quickly acquired. Within the group as a whole, target 6 was acquired

in a mean time of 14.61 days (the lowest time of all 16 targets). (It was anticipated that support or restraint might be more necessary for the patients than it in fact proved to be required).

In the 'dressing' area, four patients (Ps 53, 40, 49, 01) of the five with a previously established target fairly quickly acquired targets 10 ("assists actively when clothing is removed by nurse") and 11 ("removes, or actively attempts to remove, some of his clothing"); and P 49 had established the final target behaviour (target 12) after 60 days). All the other 13 patients acquired the base target (target 9) in between 10 and 40 days. Only five of these (Ps 26, 22, 19, 28 and 04) progressed beyond this. Four patients took between 40 and 60 days to do so while the fifth (P 04) quickly acquired target 10 in 10 days, and then target 11 in another 10 days. (Due to spasticity in both arms the final target could not be acquired). Within the experimental group, where achieved, acquisition of targets 11 and 12 was comparitively speedy with mean times of 26.00 and 20.00 days respectively.

The acquisition of the base target (target 13) in the 'going' area took a mean time of 20.76 days, all patients thus readily adapting to "being taken to the toilet by nurse". In those cases where subsequent 'going' behaviour is acquired, progress was much slower. The mean time taken for target 14 ("patient indicates his need to eliminate") by these seven patients is 48.57 days. P 53 only acquired target 15 ("'asks' to go to the toilet") by the 60th day of the experimental phase. Due to limited mobility, he was unable to reach target 16.

The rates of acquisition of target behaviours within experimental group II are very similar in the areas of 'sitting', 'dressing' and 'going'. There is, however, some difference in relatinn to the

targets of the 'eliminating' area (targets 1 - 4). In experimental group II, the mean time taken to acquire target 2 is 19.50 days. This is shorter than the mean time of 30.00 days in experimental group I. However, the overall mean time per target in the 'eliminating' area is similar in the two groups; it is 27.43 days in experimental group I and 26.45 days in experimental group II. The shorter time taken for target 2 in experimental group II may be related to the earlier discontinuation of the use of nappies during this second experiment, this being done at roughly one-third of the way through the experimental phase as opposed to two-thirds of the way in Experiment I.

2. Cumulative recording of the elimination response during the experimental phase:

Data from the model of shaping toilet behaviour provide information on the rate of acquisition of the elimination response (i.e. reduction of incontinence and establishment of continence). Additional data introduced here from the cumulative records provides information on the frequency of the elimination response (i.e. incontinent eliminations and eliminations in the toilet) throughout the experimental phase. In addition, elimination responses are differentiated according to urinary elimination and faecal elimination.

Elimination response frequencies within experimental Group I during the pre- and post-experimental phases of Experiment I are reported earlier. There is a daily average of 102.46 eliminations (all eliminations) in the pre-experimental phase and 159.86 in the post-experimental phase. This is an average number per patient per day of 5.2 - 7.0 eliminations in the pre-experimental phase and 7.8 - 9.9 in the post-experimental phase. These calculations pertain to daily recordings over 24 hours. Recordings during the experimental phase were taken over the daytime period only (i.e. 7,00 am to 10.00pm)

However, the response frequencies of patients' eliminations in the first 10 days of the experimental phase are very similar to those obtained during the pre-experimental phase; and those of the last 10 days of those of the post-experimental phase (when average number of night-time eliminations are added to experimental phase data).

Examination of the cumulative records of experimental phase elimination response frequency confirms that there is no one pattern of responding common to the experimental group. However, it does appear that some sub-groups of patients display similarities in relation to some aspects which are mentioned below. Experimental group I provides the data presented here and selected cumulative records are included as illustration.

The five patients (Ps. 53, 40, 49, 01 and 05) of the group previously potty trained are already shown to have displayed a slower rate of acquisition on the 'eliminating' targets of the model of shaping toilet behaviour. This result is clear on the cumulative records, as is a fairly erratic pattern of responding throughout the first 60 days or so of the experimental phase. In the last 30 days of the phase, all five patients showed a fairly sudden improvement. The frequency of incontinent eliminations first increased temporarily(for 2 - 5 days), and then decreased until a steady-state response level was reached. At the same time, there is an increase in the frequency of eliminations, followed by a sharp decrease and then a period of adjustment before steadying off. This pattern in the latter stages of the experimental phase is roughly evident in all five patients. They are also similar in the early part of the phase in showing a steady increase in the frequency of eliminations in the toilet, this higher frequency persisting until the

later reduction described. These features of this group of five patients can be seen illustrated in the cumulative record of P 53 (Figure 53). In this case, there was an increase in the frequency of urinary eliminations over the first 25 days, from between 2 and 5 per day in the first 15 days to between 4 and 7 per day during days 17 - 24. This higher frequency remained from then until day 59, when the increase described is apparent. The highest frequency (7 or 8 urinary eliminations/day) is maintained over a period of 9 days and the sudden decrease took place during days 75 - 85. Post-experimental recording shows this patient to have maintained a steady urinary elimination frequency of between 7 and 9 per 24 hours. The cumulative record clearly shows that the acquisition of both faecal and urinary continence took place suddenly on the 75th day of the experimental phase. (Post-experimental recording shows continence to have been maintained at a frequency of 0.1 incontinent eliminations/24 hours). A temporary period of increased incontinence coincided with the increased frequency of eliminations in the toilet, and, previous to that, urinary and faecal incontinence (having reduced slightly after the first 10 days) persisted.

Two patients (Ps 40 and 49) differ from the pattern described in the sub group of five previously potty trained patients in one respect. Both established and maintained faecal continence at the start of the experimental phase, P. 40 from day 4, and P 49 from day 10. The other three, as in the case of P 53, established urinary and faecal continence concurrently.

There appears to be less similarity within the remainder of experimental group I, i.e., those without previous training. However, some features are mentioned which do recur or occur amongst these 13 patients.

One feature is clearly noticeable in the group of 'non-improved' patients (Ps 36, 44, 27 and 02) which does not occur outwith this group. These patients fail to establish eliminations in the toilet early in the programme. This is clearly shown on the cumulative record of P 36 (Figure 54), who achieved only one elimination in the toilet (on day 5) within the first 20 days of the experimental phase. (As apparent from this illustration, the cumulative records of these four patients show an unchanging and fairly stable elimination response pattern throughout the whole of the experimental phase. This is mainly due to recording being determined by a regular nappy-changing routine, rather than by the occurence of the elimination response as in the remainder of the experimental group.) P. 36 does show some increase in the rate of urinary elimination in the toilet for a period (days 40 - 60), but remains largely unimproved at the end of the phase. Faecal elimination in the toilet occured only 6 times in total.

A group of three younger patients (Ps 26, 22, 19) within the experimental group display very similar patterns on the cumulative records. Each shows early response to toileting by eliminating in the toilet from the first day or so; a fairly long interim period (days 30 - 60) of unchanged frequency of incontinent eliminations, and erratic frequency of elimination in the toilet; establishment of faecal continence coinciding with removal of nappies (day 60); and, finally, a reduction in incontinent urinary eliminations concurrent with an increase in urinary elimination in the toilet. This distinctive pattern shown by these three patients is illustrated by the cumulative record of P 26 (Figure 55). The sharp increase in frequency of urinary eliminations in the toilet prior to stablisation at the end of the phase is clearly evident from this record, as is the

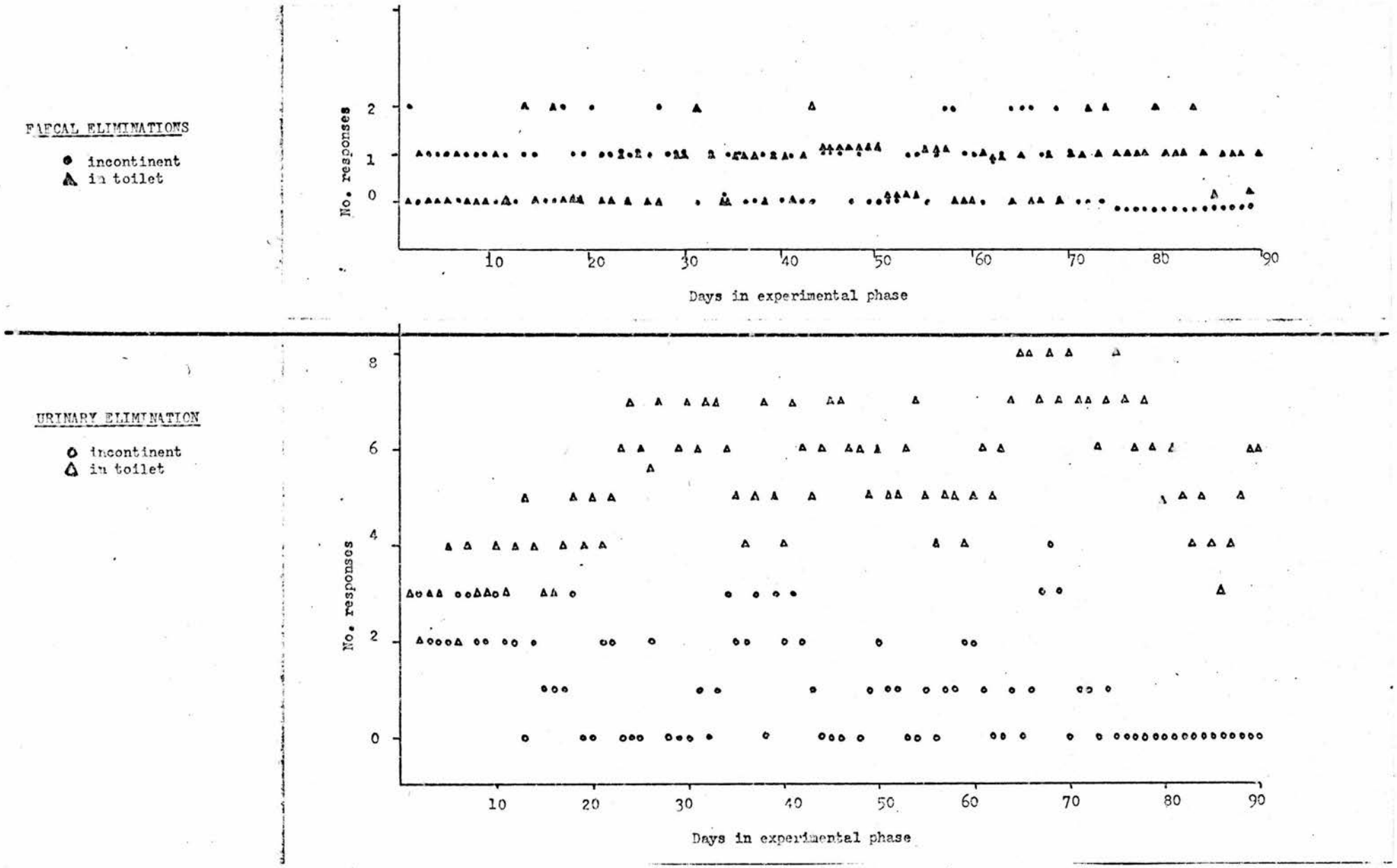



Figure 53 : Cumulative record of response rates (Patient 53).

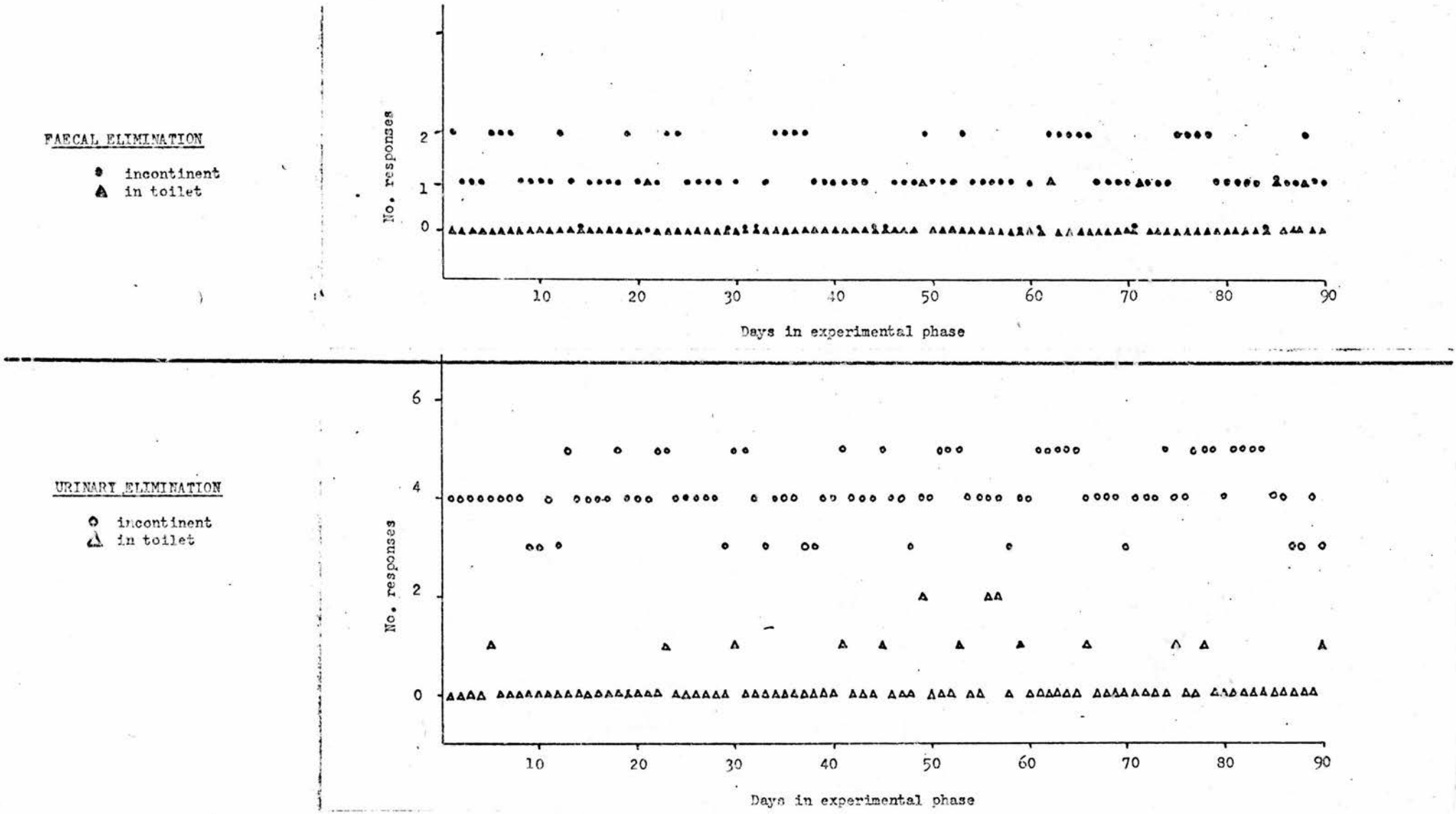



Figure 54 : Cumulative record of response rates (Patient 36).

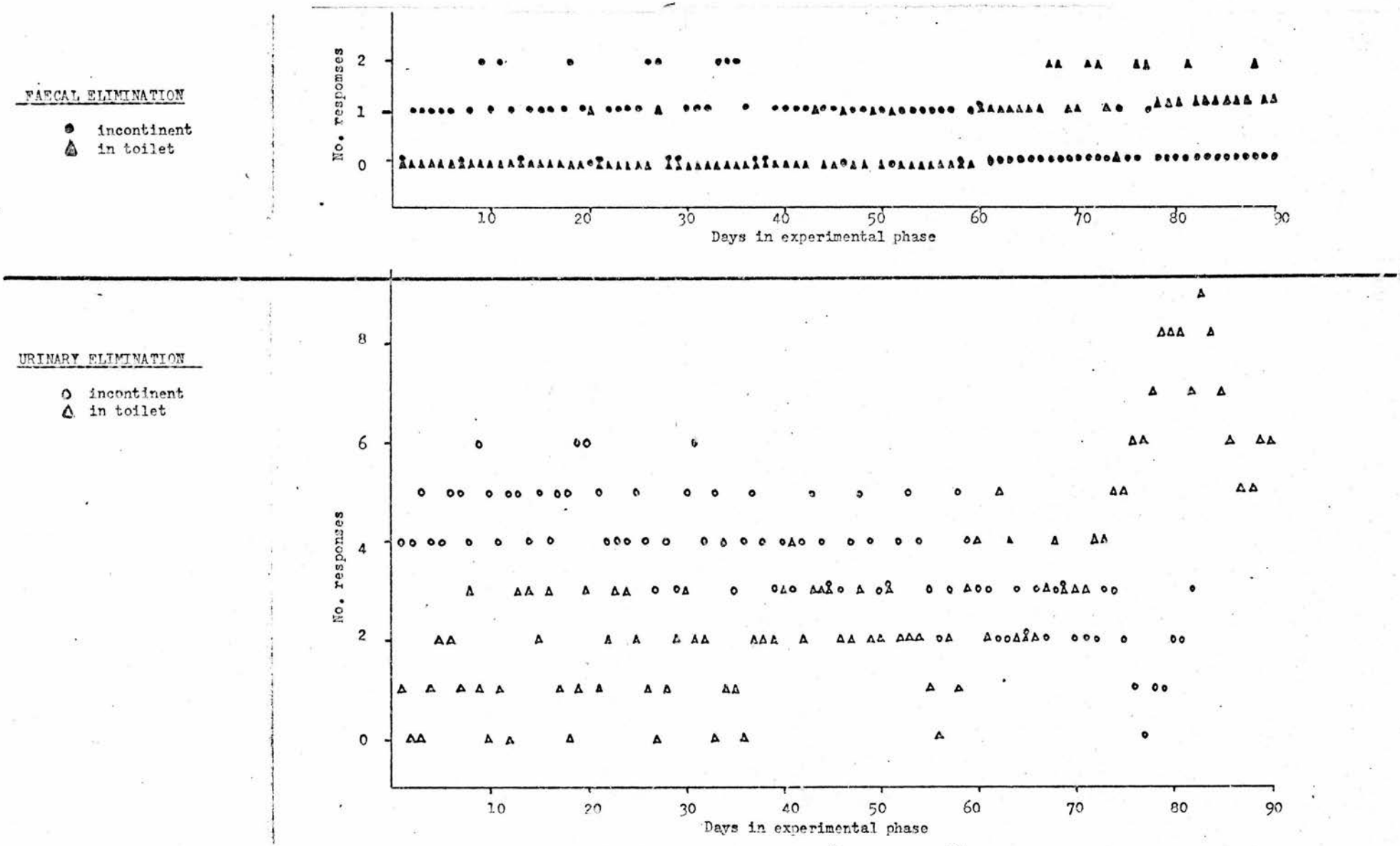



Figure 55 : Cumulative record of response rates (Patient 26).

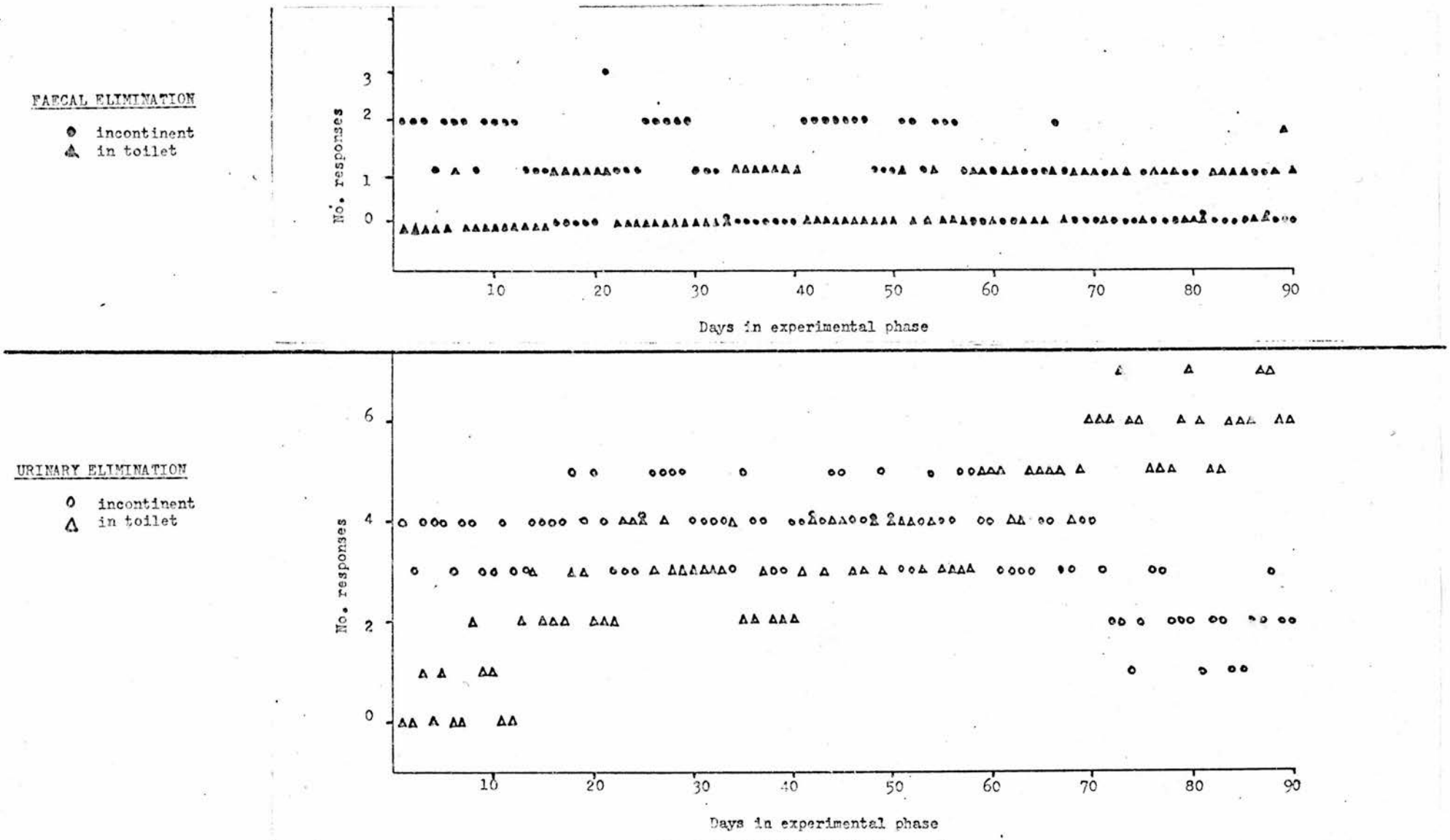



Figure 56 : Cumulative record of response rates (Patient 45).

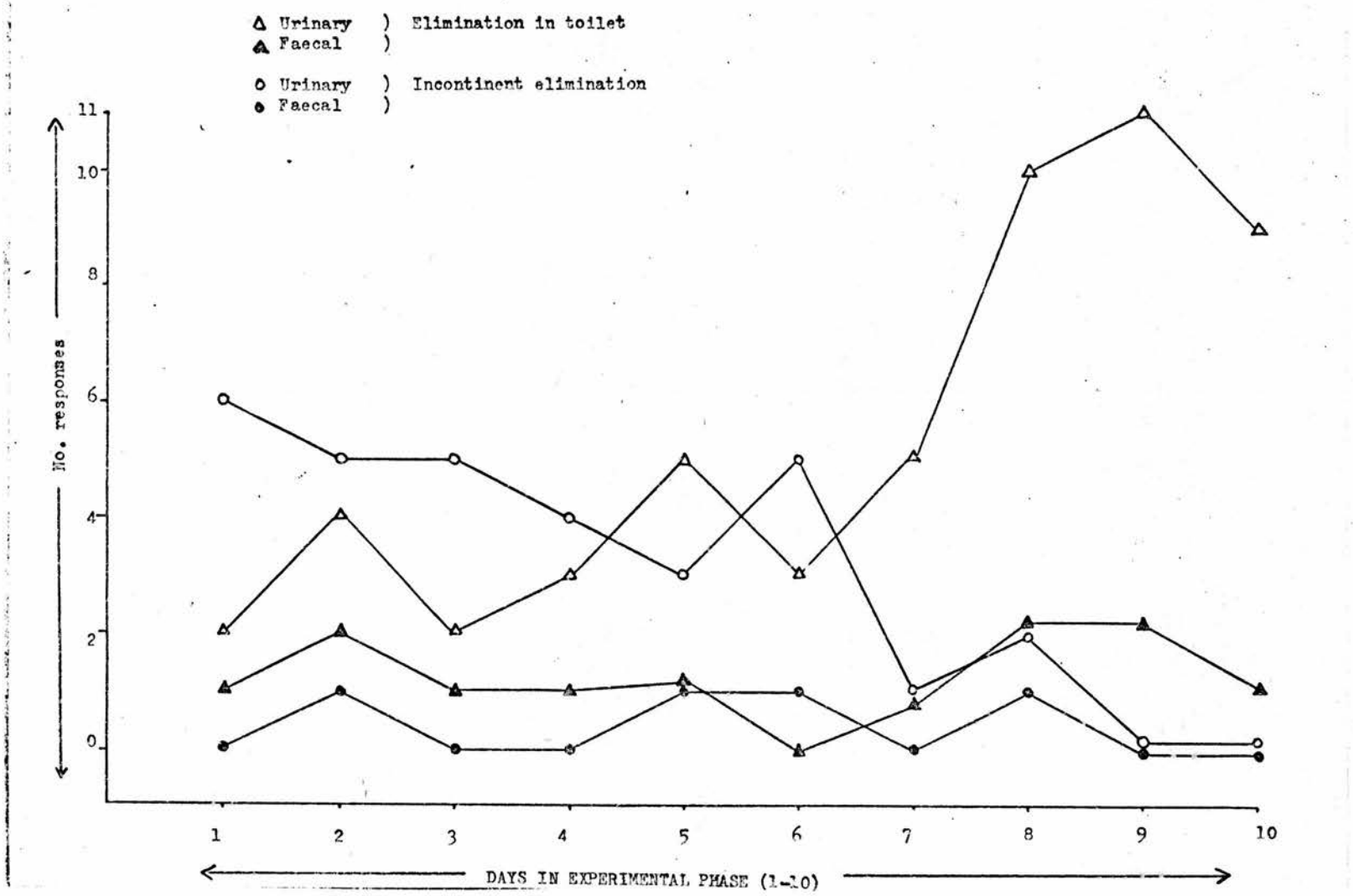



Figure 57 : Cumulative record of response rates (Patient 28).

sudden acquisition of faecal continence after day 60. It is interesting to note the prior infrequency of faecal eliminations in the toilet in this case.

In contrast, not a dramatic but a slow and steady improvement is apparent from the cumulative records of a group of three of the older patients (Ps 10, 48, 45). None of these attains total continence, but their reduction in the frequency of incontinence (both faecal and urinary) is gained steadily and accompanies a steady increase in the frequency of eliminations in the toilet (both faecal and urinary). This is illustrated on the record of P 45 (Figure 56).

Three patients in experimental group I have not yet been mentioned. These patients (Ps 28, 18, 04) have very individual patterns of responding during the experimental phase. P 04 displays a very erratic pattern in the initial stages, a period of high faecal incontinence between days 20 and 35 and then a gradual improvement towards the end of the phase. P 18 shows early improvement, followed by a very erratic period (days 30 - 60) during which a few days of continence (high frequency of eliminations in the toilet) are followed by a few days of incontinence (and low frequency of eliminations in the toilet) and this pattern repeated. Faecal continence is gained after nappies are removed on the 60th day. Reduction in urinary incontinence occurs subsequently and the frequency of urinary and faecal eliminations in the toilet stabilises.

P 28 is unique in her immediate reduction of incontinent eliminations, urinary incontinence being extinguished and faecal incontinence reduced, by the 10th day of the experimental phase. This is shown in Figure 57, providing the comulative record for the first 10 days only. Apart from temporary periods of regression,

this situation was maintained throughout the experimental phase. A high frequency of eliminations in the toilet, and particularly of faecal elimination, occured in the middle period of the phase. Stabilisation was achieved towards the end of the training period. The early response to training in the case of this patient is interesting in view of the fact that she is the oldest patient in the group (20 years), had never been toilet trained previously (being maintained in a nappy at all times), and is considered to be low-grade and disadvantaged by partial blindness and a low general level of functioning.

During the toilet training programmes, behaviour modification techniques were similarly applied to both urinary and faecal elimination responses. Looking at the frequencies of these separately on the cumulative records, it is evident that there are some differences between urination and defaecation in terms of reduction in incontinent eliminations and increase in eliminations in the toilet. In the majority of cases within experimental group I, elimination in the toilet occured more readily in the case of urination than defaecation (despite temporal patterns of defaecation being strictly followed in the toileting regime). (This can be seen illustrated in the records of Ps. 36, 26 and 45). In most cases, faecal continence was gained suddenly whereas urinary continence was gained gradually. The acquisition of faecal continence coincides, in most relevant cases, with the removal of nappies. There tends to be a temporary increase in the frequency of urinary elimination prior to reduction in urinary incontinence, this not occuring in relation to defaecation.

6. Results of the study of nurses' work activities.

A note of the method of the study is provided in Appendix 3. Observation of nurses' work activities in the experimental situation was undertaken during Assessments 1 and 2 (i.e. pre- and post-experimental phases of Experiment I).

During the pre-experimental observation, 19 nurses were involved and 142 ten-minute observations recorded (i.e. total observation time of 1420 minutes.) 15 nurses were involved in post-experimental observation and 135 ten-minute observations recorded (i.e. total time of 1350 minutes). Observations were fairly equally divided between morning and afternoon shifts. Tables 120 and 121 summarise these data. (The intended observation time of 100 minutes per nurse was not attained in either observation phase.) 241 activities were recorded in the pre-experimental phase and 230 in the post-experimental phase. The mean times per activity are 5.89 and 5.86 minutes respectively (see Table 122).

Of particular interest are observations which relate to the incidence of work activities concerned with incontinence and toileting of patients in the experimental situation. These results are contained in Table 123. The incidence of all work activities determined by patients' elimination is high at 38.95% in the pre-experimental phase and remains high at 37.80% in the post- experimental phase. The decrease is so slight that it can be concluded that no change at all occured. However, when the two types of activity concerned with elimination - management of incontinence and toileting - are examined, there is an interesting change in work pattern. The incidence of activities related to incontinence has decreased from 21.97% in the pre-experimental phase to 15.20% post-experimentally. Correspondingly, the incidence of activities relating to toilet

management has increased (from 17.01% to 22.60%). Thus, while the overall incidence of elimination-determined work activities remained unchanged, work arising from incontinence decreased. This decrease can be suggested to result from the reduction in incontinence within the experimental group (E I) following the behaviour modification toilet training programme. The effect of this therefore appears to have altered the pattern of nurses' work but not to increase the workload overall. The alteration is towards an increase of activity which is beneficial to the patients and a decrease of activity which is unpleasant for the nurses.

Table 124 contains the frequency of observations recorded in each of the 26 nurses' work activity classes. The percentage of the total number of activities observed is calculated to allow pre- and post-experimental comparison. These activities can be loosely categorised as 'physical nursing', 'therapeutic nursing' and miscellaneous nursing activities. Table 125 contains data in this categorisation. What this clearly shows is that 'physical nursing' is the predominent feature in the nurses' workload. 67.78% of all activities observed pre-experimentally are concerned with patients' physical needs; whereas, only 10.75% of activities are 'therapeutic' ones. Post-experimental data however suggest a trend towards a decrease in 'physical nursing' and an increase in 'therapeutic nursing'. 64.74% of all activities observed post-experimentally are categorised as 'physical' and 18.23% as 'therapeutic', the respective decrease and increase being 4.04% and 7.48%.

Examination of observations made on individual nurses reveals little difference between work activities undertaken by various categories of nursing staff. The pattern of the ward sisters' work differed from the rest of the staff in containing a higher incidence

Table 120: Units of observation in Pre- and Post- Experimental Phases: Observation of nurses' work activities study.

| | Pre-Experimental | Post-Experimental |
|---|---|---|
| No. of observations during morning shift | 77 | 72 |
| No. of observations during afternoon shifts | 65 | 63 |
| Total No. of observations | 142 | 135 |
| Total observational time | 1420 mins | 1350 mins |

Table 121: Numbers of nurses observed and mean observation time per nurse.

| | Pre-Experimental | Post-Experimental |
|---|---|---|
| No. of nurses observed | 19 | 15 |
| Total observation time | 1420 mins | 1350 mins |
| Mean time per nurse | 74.73 mins | 90.00 mins |
| Standard deviation | 5.356 | 4.235 |

Table 122: Number of activities recorded and mean time per activity in pre- and post-experimental phases.

| | Pre-Experimental | Post-Experimental |
|---|---|---|
| No. of activities recorded | 241 | 230 |
| Total observation time | 1420 mins | 1350 mins |
| Mean time per activity | 5.89 mins | 5.86 mins |

Table 123: Percentage of all work activities related to patients' elimination (incontinence management and toileting)

| | Pre-Experimental (%) | Post-Experimental (%) |
|---|---|---|
| Activities related to incontinence (Nos 5,9,10) | 21.97 | 15.20 |
| Activities related to toileting (No. 8) | 17.01 | 22.60 |
| % all activities related to patients' eliminations | 38.98 | 37.80 |

Table 124 : Frequency of observations recorded in each of 26 classes of nurses' work activities; percentage of all activities.

| Act. Class No. | Annotated description of activity | Pre-Exp. n | Pre-Exp. % | Post-Exp. n | Post-Exp. % |
|---|---|---|---|---|---|
| 1 | Feeding | 26 | 10.78 | 19 | 8.26 |
| 2 | Meals | 05 | 2.07 | 07 | 3.04 |
| 3 | Dressing | 24 | 9.90 | 20 | 8.69 |
| 4 | Linen & Clothing | 12 | 4.97 | 10 | 4.34 |
| 5 | Sluicing | 09 | 3.73 | 06 | 2.60 |
| 6 | Bedding | 04 | 1.65 | 03 | 1.30 |
| 7 | Washing & Bathing | 17 | 7.05 | 16 | 6.95 |
| 8 | Toileting | 41 | 17.01 | 52 | 22.60 |
| 9 | Incontinence Management | 38 | 15.76 | 26 | 11.30 |
| 10 | Excreta | 06 | 2.48 | 03 | 1.30 |
| 11 | Playing | 16 | 6.63 | 19 | 8.26 |
| 12 | Recreation | 01 | 0.41 | 03 | 1.30 |
| 13 | Occupation | 01 | 0.41 | 02 | 0.86 |
| 14 | Preparation for Off-Ward | 01 | 0.41 | 01 | 0.43 |
| 15 | Interaction with Non-Nurses | 00 | 0.00 | 01 | 0.43 |
| 16 | Relatives | 01 | 0.41 | 01 | 0.43 |
| 17 | Nurses' Meetings | 00 | 0.00 | 00 | 0.00 |
| 18 | Talking | 04 | 1.65 | 07 | 3.04 |
| 19 | Patient Training | 04 | 1.65 | 10 | 4.34 |
| 20 | Socialisation | 00 | 0.00 | 01 | 0.43 |
| 21 | Patient Assessment | 00 | 0.00 | 00 | 0.00 |
| 22 | Technical Nursing | 07 | 2.90 | 05 | 2.17 |
| 23 | Domestic Duties | 09 | 3.73 | 07 | 3.04 |
| 24 | Sick Nursing | 01 | 0.41 | 00 | 0.00 |
| 25 | Equipment | 00 | 0.00 | 01 | 0.43 |
| 26 | Administration | 14 | 5.80 | 10 | 4.34 |
| n = 26 | TOTAL: | 241 | (99.81) 100% | 230 | (99.88) 100% |

Table 125: Nurses' activities categorised as (a) 'physical'; (b) 'therapeutic'; (c) other.

| | Activity | Class No. | Pre-Exp % | Post-Exp % |
|---|---|---|---|---|
| (a) 'Physical' | Incontinence management | 5,9,10 | 21.97 | 15.20 |
| | Toilet management | 8 | 17.01 | 22.60 |
| | Feeding | 1,2 | 12.85 | 11.30 |
| | Dressing | 3 | 9.90 | 8.69 |
| | Washing and Bathing | 7 | 7.05 | 6.95 |
| | All 'Physical Activities' | | 68.78 | 64.74 |
| (b) 'Therapeutic' | Playing | 11 | 6.63 | 8.26 |
| | Talking with patients | 18 | 1.65 | 3.04 |
| | Patient training | 19 | 1.65 | 4.34 |
| | Recreation | 12 | 0.41 | 1.30 |
| | Occupation | 13 | 0.41 | 0.86 |
| | Socialisation | 20 | 0.00 | 0.43 |
| | All 'Therapeutic' Activities | | 10.75 | 18.23 |
| (c) Other | Miscellaneous | 4, 6, 14, 15, 16, 17, 21, 22, 23, 24, 25, 26 | 20.28 | 16.91 |
| | All Activities | | 100% (99.81) | 100% (99.88) |

of 'miscellaneous' work activities (which include administration) and a lower incidence of 'physical nursing' activities.

It is recognised that the method of the study was necessarily crude and that no criteria of validation of results were accomodated in the procedure. Testing of observer reliability (particularly in relation to activity classification) by inter-observer comparison would have improved the procedure, but was not practicable. Data obtained from continuous observation would have allowed the validity of the observations collected intermittently to be assessed. However, presentation of results from the data obtained is intended to provide a rough indication only of the pattern of nurses' work in the experimental situation pre-experimentally and changes in this pattern post-experimentally. Opinions of nursing staff and the subjective impressions of the researcher supported that the results presented a realistic assessment of the patterns and changes in the nurses' work.

## 7. Evaluation of nurse training.

Absence of an appropriate evaluative tool, changes in the nursing staff population and demands on the researcher's time prevented any systematic evaluation of the effect of the nurse training programme on nurses' performance in implementing the experimental procedure. Results of an attempt to undertake some evaluation are reported here.

During the final week of Experiment I each of the nurses was observed with a view to obtaining some evaluation of

(i) ability in applying the toilet training procedure and
(ii) level of knowledge of the techniques involved.

Observations of 17 nurses was undertaken using a semi-structured schedule (see Appendix 3). One episode of incontinence management and one of toilet management was observed for each nurse. The nurse's

behaviour during these episodes was recorded; techniques utilised were noted; and the appropriateness of the nurse's procedure was evaluated. The nurse was then asked specific questions about that patient's programme schedule and current targets and asked to appraise her performance.

Of the 17 nurses observed, only two were considered to have 'failed' in the implementation of the procedure correctly. Neither initiated a non-reinforcement period following the episode of incontinence involved. One of the nurses carried the patient (who was mobile) to the toilet and omitted any training of pre-elimination toilet skills. She did, however, appropriately reinforce urination in the toilet. The other nurse scolded the patient for incontinence and changed her, without toileting. Neither nurse was correct in identifying the current target behaviours nor able to identify and describe techniques used. Both of these nurses had undergone training, one in the formal training programme and the other during an induction programme. In discussion, both nurses were obviously aware of their limitations. One had previously expressed disinterest in the programme and declined to become actively involved, although she was pleasent and interested in her work in the ward. The other nurse was not particularly well known to the researcher and she felt ill-prepared to carry out the programme's procedures and suggested that further training be introduced. Both nurses commented on their difficulty of understanding the techniques and finding time to become conversant with individual patients' programme details.

The remaining 15 nurses of those observed were, on the whole, implementing the programme accurately and vigorously. All carried out the management of incontinence procedure exactly as required,

showing ease in dealing with the non-reinforcement of incontinence procedure and precision in the timing of this. With regard to the toilet management, most coped accurately, and all but one nurse dispenses reinforcement immediately and approximately. Two nurses were inaccurate in stating current target behaviours and neither concentrated on 'dressing' behaviour as required for the patients concerned. The remaining nurses showed a high degree of organisation and skill in relation to applying techniques to the pre-elimination behaviours. A criticism the researcher noted in several cases was that prompting techniques were rather liberally applied to targets already established. Of 10 situations observed where the toileting session did not follow an episode of incontinence, only 4 included attention by the nurse to 'going' behaviour. In these cases, the nurses used prompting by calling the patient's name and giving verbal instruction or by physical guidance and reinforcement, and showed evidence of attempting to shape responses relevant to 'going' behaviour. In all 15 appropriately managed situations', the use of reinforcers was observed to be excellently managed. All nurses used social approval and, in most cases, also used a material reinforcer. In discussion, the majority of the nurses were vocal and showed ability to describe and discuss techniques. It was noticeable that few of the nurses depended upon conventional terminology, most translating the technical language into everyday words. It was a frequently-mentioned dissatisfaction that literature and the training programme contained 'too much jargon'.

For the researcher, the evaluation procedure was interesting on several accounts. It provided the opportunity to ensure observation of the practice of all nurses in the ward at a specific

point during the study. It identified 2 nurses whom the researcher felt to be implementing the programme poorly. One had previously been identified ; the other not. More positively, it provided evidence of, on the whole, a high degree of accuracy amongst the staff in relation to both practical skills and knowledge of individual patients. Amongst the staff, 4 nurses stood out from this evaluation as having developed an unexpectedly high degree of technical skill and knowledge in relation to the behaviour modification programme.

CHAPTER 12:

SUMMARY OF RESULTS OF THE EXPERIMENTAL STUDY

## Summary of Results.

1. Results of toilet training: Of the 35 patients to be involved in the toilet training programmes of Experiments I and II, 27 patients achieved varying reductions in the frequency of incontinent eliminations and degree of incontinence and, in addition, acquired varying levels of toilet behaviour. The remaining 8 patients showed minimal improvement.

2. Main results of Experiment I: 18 patients were involved in the experimental group which underwent behaviour modification toilet training over a 90-day period. Control of the experiment was provided by a matched group of 18 patients.

2.1 Patients in the control group showed no, or minimal, improvement (in terms of reduction of incontinence or acquisition of toilet behaviour) at post-experimental assessment.

2.2. Post-experimentally, the experimental group showed a reduction from 76.48% to 25.81% in the percentage of incontinent eliminations; and an increase from 25.52% to 74.19% of eliminations in the toilet.

2.3. The prevalence of 'total incontinence' was reduced from 72.22% (n = 13) to 22.22% (n = 4) in the experimental group. The same reduction was achieved in relation to the number of patients maintained in nappies.

2.4. The degree of incontinence of the 14 patients who improved was reduced by between 18% and 89%.

2.5. All patients acquired at least some of the toilet behaviour targets of the programme. The greater acquisitions were made in

targets relating to 'sitting' and 'eliminating'; the lowest acquisition was made on the 'going' tartets. High positive correlations are identified between the score on 'eliminating' targets and that on 'sitting' targets; and between the overall score and that on 'sitting' targets.

2.6. No patient had established all 16 targets by the end of the programme. 55.90% of the final target behaviour (i.e. 16 targets) was established by the group. This represents an increase over baseline of 47.91%. A mean of 8.94 targets per patient was achieved by the end of the programme.

2.7 The difference between the mean improvement of the experimental group (41.1111%) and that of the control group (3.3333%) on the 'toilet and washing' section of the P-PAC is statistically significant (T value = 9.24; df = 17; $p < 0.001$).

2.8 The experimental group showed a substantial improvement in general level of functioning (as assessed by P-PAC) over the experimental phase. The percentage gain over baseline on the total score is 13.89% (from 32.00% to 45.89%). The mean number of skills gained per patient is 18.05. Improvement was obtained in relation to all quadrants, sections and levels of the P-PAC. The greatest percentage gain over baseline was obtained in the 'self-help' quadrant (16.94%) and the lowest in the 'communication' quadrant (9.94%).

2.9. In the experimental group there is a significant correlation between the rank-order of pre- and post-experimental scores, but no correlation between baseline scores and subsequent gain over baseline, in respect of total scores on the P-PAC.

2.10 A minimal improvement in general level of functioning over the experimental period was achieved by the control group. The

difference between the mean improvement on the total P-PAC of the experimental group (13.83333%) and that of the control group (2.8889%) is statistically significant (T value = 8.84; df = 17; $p<0.001$).

3. Main results of Experiment II : 17 patients were involved in the experimental group (most had acted as controls in Experiment I) and underwent toilet training for 90 days. 14 of these patients improved in terms of reduction in incontinence and acquisition of toilet behaviour.

3.1. The prevalence of 'total incontinence' was reduced from 70.59% to 17.64%. The percentage of incontinent eliminations decreased from 74.05% to 28.29%; and that of eliminations in the toilet increased from 25.95% to 71.71%. The degree of incontinence of the 13 patients who improved was reduced by between 28% and 88%.

3.2. All patients acquired at least some of the toilet behaviour targets of the programme, and 1 patient had established all targets by the end of training. 52.94% of the final target was established by the group, this representing a 42.32% increase over baseline. A mean of 8.47 targets per patient was achieved.

3.4. All patients improved in terms of general level of functioning (as on P-PAC). The percentage gain over baseline on the total score is 11.67% (from 40.68% to 52.35%). For individual patients, the gain over baseline ranges from 0.8% to 20.7%. The greatest gain was obtained in the 'self-help' quadrant (from 44.48% to 61.55%).

4. Results from comparing Experiments I and II: show the results of the individual experiments to be highly similar and, on variables statistically tested, no significant difference is obtained.

4.1. The reduction in percentage of incontinent eliminations obtained is similar; it is 50.67% in Experiment I and 45.76% in Experiment II.

4.2. The pre- and post-experimental mean degree of incontinence within both groups is highly similar. In Experiment I this was reduced from 81.777% to 32.888%; in Experiment II from 81.764% to 33.000%.

4.3. On the 'model for shaping toilet behaviour', similar percentage gains over baselines and proportions of the total model established were achieved in both groups. In Experiment I, 55.90% of the final target was established and, in Experiment II, 52.94%. The gain over baseline is 47.91% and 42.32% in Experiments I and II respectively.

4.4. Substantial improvements in general level of functioning occured concurrent with the experimental phases of Experiments I and II. Calculation of t-tests on the differences between the mean pre- and post-experimental scores of experimental groups I and II (at the relevant Assessments) show that there is no significant difference between these mean scores on the total P-PAC, quadrants, sections or levels.

5. Results from long-term evaluation: carried out 12 months and 6 months after Experiments I and II respectively:-

5.1. Of the 27 patients who did improve following training, none has regressed to pre-training level of incontinence. Slight regression (not exceeding 10% in degree of incontinence) occured in 10 cases. 12 patients had maintained the improved level reached. The remaining five patients had further improved.

5.2. Of the eight patients who did not improve, two remain 'totally incontinent'. The other patients, at the time of re-evaluation, were showing improvement during current training.

5.3. All patients, except three, had maintained the post-experimental level of toilet behaviour achieved (as on the 'model'). Regression is not evident to any extent on this basis. Further progress had been made by the majority of patients. Five patients had established all 16 targets and four other patients, all but 1. Thus, nine of 27 improved patients (i.e. 33%) could be considered to be "toilet trained" by this assessment. At this point, 63.34% of the total model was established (71.62% of 'eliminating' targets; 73.65% of 'sitting' targets; 60.81% of 'dressing' targets; 47.30% of 'going' targets).

5.4. All patients had an improved score on the P-PAC assessment of general level of functioning in comparison with the previous assessment.

6. P-PAC Results: 24 of the 27 'improved' patients show that their period of greatest improvement in general level of functioning occurred concurrent with their involvement in one of the experimental behaviour modification toilet training programmes. The suggested causal relationship between 'acceleration of progress' and 'the experimental influence' is supported by results of statistical analysis which show that: while there is no significant difference between experimental group I and control group I at baseline (Assessment 1), or between Experimental groups I and II post-experimentally (Assessment 2 and 3), there is a statistically significant difference between experimental group I and its control group (C I) at the post-experimental assessment of Experiment I.

7. Results pertaining to the total patient population (N = 52)

7.1. There is an overall reduction in the prevalence of incontinence

in the experimental situation. This occurred gradually over the period of the study and can be attributed largely to the results of Experiments I and II. The percentages of incontinent eliminations (in the overall elimination response rates of the total population) at the 4 Assessments were 53.87%, 37.23%. 28.01% and 25.89%.

7.2. Distribution of pateints by degree of incontinence provides a picture of the changed 'ward profile' at the four assessments of the study.

7.3. The number of items of linen used due to incontinence was gradually reduced from 9343 (Assessment 1) to 8274 (Assessment 2) to 4912 (Assessment 3) and, finally, to 3989 (Assessment 4).

7.4. The percentage of the patient population maintained in nappies reduced from 65.38% (Assessment 1) to 38.46% (Assessment 2) to 28.84% (Assessment 3) to 13.46% (Assessment 4).

8. Results of Comparison of 'improved patients' (n = 27) and 'non-improved patients' (n = 8)

8.1. There is minimal difference between the two groups in terms of C.A., M.A. ,length of hospitalisation and sensory incapacity.

8.2. In the 'improved' group, there is a higher proportion of females, of patients with known aetidogy, and of patients previously undergoing potty training. There is a lower incidence of low-grade patients, lower prevalence of epilepsy and a higher general level of functioning.

8. 3 In the 'non-improved' group, there is a lower general level of functioning, and a higher prevalence of epilepsy, low-grade deficiency and impairment of mobility.

9. Results relating to acquisition of continence and toilet behaviour:

9.1. The rates of acquisition of toilet behaviour (as assessed on the 'model'), and components of it, broadly show inter-group (E I and E II) similarity but great inter-subject variation. The mean number ofdays taken to establish targets within the areas of the model are 27.43 ('eliminating'), 21.02 ('sitting'), 28.62 ('dressing') and 30.47 ('going').

9.2. Rates and patterns of acquisition of continence (i.e. frequency increase in elimination in toilet, decrease in incontinent elimination), as assessed from cumulative records, show great inter-subject variations. In the majority of cases, urinary continence was established gradually and before faecal incontinence, which was quickly established. Older patients tended to show a slow improvement and a steady response rate; whereas some younger patients displayed erratic patterns of responding and a reduction in urinary incontinence immediately following discontinuation of the use of nappies.

10. Results pertaining to the nursing staff:

10.1 Observation of nurses work activities showed that a majority (68.78%) concerned 'physical nursing' and a minority were 'therapeutic' in nature (10.75%) at pre-experimental assessment. Post-experimental assessment indicated some reduction in the incidence of 'physical' activities (to 64.74%) and an increase in that of 'therapeutic' activities (to 18.23%).

10.2. The proportion of all activities determined by patients' elimination was high at both pre- and post-experimental assessments (38.98% and 37.80% respectively). However, following the toilet training programme, only 15.20% of activities related to management of incontinence (compared with 21.97% pre-experimentally) and the greater

proportion (22.60%) to toilet management (compared with 17.01% pre-experimentally).

10.3. Evaluation of nurses' implementation of the experimental procedure showed a high degree of accuracy amongst the staff in relation to both practical techniques and knowledge of patients' training requirements. Only two of 17 nurses' observed were felt to be unsatisfactory; and four nurses stood out as having an unexpectedly high degree of skill and knowledge.

CHAPTER 13:

# DISCUSSION OF THE EXPERIMENTAL STUDY

## Introduction

It is clear that the experimental study yielded a wealth of data, and that discussion cannot accomodate comment on all. It seems appropriate to select for discussion the main features and results of the study which contribute towards a greater understanding of the subject and problem from which it derived. The main part of discussion will concentrate upon an appraisal of results obtained in the context of the aim and objectives of the study. Reference to, and comparison with, results of relevant other studies will be made where appropriate. An appraisal of the research method must also be undertaken and the validity and generality of results determined on this basis. Finally, it remains to attempt to evaluate what contribution arises from this study to the subject of behaviour modification in mental deficiency nursing.

The absence of hypothesis - testing in the study presents a particular problem. The experimental results cannot be evaluated simply as either supporting or rejecting a particular hypothesis. The primary aim of the study was to evaluate the effectiveness and practicability of a behaviour modification toilet training programme for a group of mental defectives within a representative nursing situation. Whether or not the training programmes implemented were 'effective' and are generally 'practicable' cannot be concluded. Evaluation concerned a multiplicity of variables and produced a complex set of results. Thus, discussion of these is necessarily evasive of any singular conclusion and sets out rather to appraise the parts of the study rather than its whole.

## Discussion of Results.

The majority of results pertain to the various effects of the experiments upon the patients involved. In reviewing the literature on behaviour modification toilet training it was criticised that measures of assessment of results were not consistent, and often not related to objectives of training. For example, Dayan (1964) reported results of toilet training in terms of a decrease in laundry use. A further problem confounding direct comparison of the results of this study with those of previous studies arises from the concern of many with training for continence only, and not 'toilet training'. Those studies which were concerned with toilet training as "a complex operant and social learning process" (Azrin and Foxx, 1971) do not detail their methods of assessing the effect of training upon acquisition of toilet behaviour. For example, Giles and Wolf (1966) provide detail of the establishment of the elimination response in cumulative records of response rates, but do not evaluate acquisition of toilet skills systematically between subjects. Azrin and Foxx (1971) similarily concentrate on response rates as a single method of evaluation. Despite their recognition of 'toilet training' as an objective, the procedure is described in conclusion as "a method of eliminating incontinence". In these limited terms, results of the present study compare favourably with most studies reported. The percentage of incontinent eliminations was reduced from 76.48% to 25.81% in Experiment I; and from 74.05% to 28.29% in Experiment II. Between the beginning and end of the study, the percentage of incontinent eliminations in the total patient population was reduced gradually from 53.87% to 25.89%. The baseline data undoubtedly conceal a higher frequency of incontinence than that recorded due to the incomplete recording on those patients who

were maintained in nappies. If this is so, then available results underestimate the reduction in incontinence achieved. 65.38% of the total population were maintained in nappies at Assessment 1 compared with 13.46% at Assessment 4. The number of items of linen used due to incontinence was reduced from 9343 (Assessment 1 ) to 3989 (Assessment 4). This reduction compares favourably with that of 41.68% obtained by Levine and Elliott (1970), for example.

A distinctive feature of the results of toilet training in the present study is that they include measure of the acquisition of toilet behaviour by individual patients. This measure is related to the procedure of training and the components of toilet behaviour; and permits inter-subject comparison. Thus, the results can be directly compared with the objective of training and a patient's precise toilet training status assessed. In the present study, only one patient could be considered to be "toilet trained", by the end of training, in these terms. Data obtained from evaluation of patients' progress on the 'model for shaping toilet behaviour' are valuable in a variety of observations provided. In both experimental groups (E I and E II), about 50% (55.9% and 52.94%) of the model was established by the end of training. A mean of 8.94 and 8.47 targets per patient were established in the groups respectively. Rates of acquisition of targets varied between patients, and in relation to the four areas of the 'model' ('eliminating' - 27.43 days; 'sitting' - 21.02 days; 'dressing' - 28.62 days; and 'going' - 30.47 days). The greatest degree of acquisition was made on 'sitting' targets and 'eliminating' targets; and the lowest on 'going' targets. In data from Experiment I, a high positive correlation was identified between the scores on 'eliminating' and 'sitting' targets, and between the overall score and that on 'sitting' targets. The 'sitting' targets

were, therefore, those most speedily established and most frequently acquired and would appear to be instrumental to the acquisition of the elimination response. This hypothesis would require to be explicitly tested and the 'sitting' targets compared with other areas of the model before any finding could be confirmed. However, it may be that the establishment of sitting behaviour is a crucial factor in the process of successful toilet training. It is obviously a pre-requisite of continent elimination but may, in addition, have properties as a discriminative stimulus. The development of 'the model for shaping toilet beahviour' for the study provided an invaluable training guide and set of objectives, and a fruitful method of evaluation. For it to become a reliable evaluative tool, further research would be required. A more detailed breakdown into smaller successive approximations would be advantageous. The relationship of these across levels of target behaviour, and within the four areas of toilet behaviour, would then require to be empirically tested. The poor acquisition of targets in the 'going' area merits remark. Few studies contain details of whether or not patients established independence in going to the toilet or asking to be taken. Smith et al. (1975) report success in producing "self-initiations to the toilet" in five patients trained using a prompt and fade procedure. Giles and Wolf (1966) successfully shaped self-initiated toileting by reinforcing movements into the bathroom. The subjects were kept in its proximity by being attached to a rope and this 'prompt' was faded out. The prevalence of impaired mobility and absence of language within the research sample of the present study inevitably limited self-toileting. However, it should be noted that some improvement in this behaviour was obtained by Assessment 4 at which 47.30% of 'going' targets were established in the research sample.

Thus, behaviour modification toilet training produced a variety of results. Summary of these can be no more explicit than to say that 27 of 35 patients trained achieved varying reductions in the frequency of incontinent eliminations and in degree of incontinence; and, in addition, acquired varying levels of toilet behaviour. Precise results are available on each individual patient.

Ellis (1963) postulated that " .. the problem is not in training the patient to use the toilet but to 'keep him trained'". Rentfrow and Rentfrow (1969) identified investigation of the problem of regression as a major area for research. Evidence of the problem is contained in the studies of Baumeister and Klosowski (1965) and Fewtrell (1973), as reported. The extent of the problem remains uncertain due to lack of long-term evaluation of studies. In the present study the evaluation made 12 months after Experiment I and six months after Experiment II was undertaken expressly to investigate long-term effects of training. Results confirm that of the 27 patients who did improve following training, none displayed regression to pre-training level of performance ( in terms of degree of incontinence and level of toilet behaviour). Twelve patients had maintained their improvement in degree of continence following training and five others actually further improved. Slight regression (not exceeding 10% in degree of incontinence) was evident in the remaining ten patients. Further progress in terms of level of toilet behaviour had been made by the majority of the 27 patients. Nine of these could be considered to be "toilet trained", or almost, at this assessment point (five had established all 16 targets; and four all but 1 target).

It is therefore clear that regression to pre-training level of performance had not occurred in any case, and that slight regression in ten cases concerned incontinence and not toilet behaviour. In

addition to showing regression to be a minimal problem in the present study, follow-up data revealed considerable progress in the majority of patients. It was earlier hypothesised tentatively that regression may be a greater problem when training is carried out in an isolated and controlled environment. The results of this study, implemented in the patients' usual ward situation and without stringent stimulus control, add support to the opinion of Giles and Wolf (1966) that the effects of stimulus generalisation can be increased by training patients in their ward and using available reinforcers in that situation. It does appear that the effects of toilet training can be enduring and the contribution of maintenance training towards ensuring this cannot be over-emphasised. In research studies and clinical programmes provision for this must be made. Azrin and Foxx (1971) describe various procedures instituted to ensure administrative feasibility and adequacy of supervision in their post-maintenance procedure. The Ward Sisters assumed responsibility for maintenance training in the present study and nursing staff expressed and displayed a commitment to ensure that effects of training would continue and would be enhanced.

Hundziak et al. (1965) and Kimbrell et al. (1967) showed, from experimental studies, that operant conditioning methods of toilet training were superior to conventional methods. Some support to this finding can be provided from results of Experiment I of the present study. The experimental and control groups each contained five patients who had been being "potty trained" by the ward nursing staff prior to the study. The nurses contined to apply this 'conventional' ( habit training) method to the five control group patients during the experimental phase while the five experimental group patients underwent behaviour modification toilet training. Comparison of the post-experimental toilet status of these two sub-groups shows that minimal improve-

ment in level of toilet behaviour was acquired by control group patients compared to that by experimental group patients. Patients in experimental group I reduced their degree of incontinence by between 18% and 47%. One patient in the control group (C I) showed a reduction of 10% and the remaining four in fact showed slight increases. This may have arisen because the nursing staff began to give up their 'competition' towards the end of the experimental phase. They began to voluntarily express opinions that the behaviour modification programme was achieving better results more quickly and looked forward to the inclusion of their "potty training" group in the second experiment.

A specific objective of the study was to look at the relationship of patient characteristics to successful or unsuccessful response to toilet training. To this end a comparison of 'improved' patients and 'non-improved' patients was made. There appears to be minimal difference between these two groups in respect of C.A., M.A., and length of hospitalisation. In the 'non-improved' group, there is a lower general level of functioning, and a higher prevalence of epilepsy, low-grade deficiency and impairment of mobility. These findings are interesting observations, but do not particularly lend support to any specific evidence in the literature. Ellis (1963) hypothesises that failure to become toilet trained may be due to inadequate training, decreased learning ability or damage to the central nervous system. It may be conjectured that inadequate training was contributory in the present study. A feature of the 'non-improved' patients was a low initial continent elimination response rate. This limited opportunities for reinforcement and lack of early progress, compared with other patients, resulted in a less intensive effort by the nursing staff. For example, the number of toilet sessions remained at only two or

three and, on busy days, these were the first patients to be 'left out'. It is interesting that six of these eight 'non-improved' patients were beginning to respond well to toilet training commenced shortly prior to Assessment 4. The findings of the longitudinal study of Lohman et al. (1967) can neither be supported nor questioned on the basis of present data, although the conclusion that patients with a very low I.Q. have small chances of success in toilet training might be queried. No attempt will be made to suggest criteria upon which mental defectives might be selected for toilet training, or their potential for training assessed. Data from the present study refute that "consistencywith respect to the timing of eliminative functions" (Baumeister and Klosowski, 1965) is necessarily an advantageous characteristic; and that "patients showing highly eratic $R_e$ should not be included" (Ellis, 1963). The concept of neural maturation (McGraw, 1940), basic to that of "toilet training readiness" seen to be relevant by Hundziak et al. (1965), has limited usefulness because of the difficulties in assessing this. To attempt to identify criteria on which selection and prediction might be made is to refute the evidence of studies which shows behaviour modification toilet training to have been effective for patients of all ages and levels of ability or handicap. Even the prerequisite of mobility becomes questionable after the experience of the present study. One patient (P 22), previously almost totally immobile due to severe spasticity in all limbs, eventually achieved almost maximum reduction in incontinence and a reasonable degree of acquisition of toilet skills. The random allocation of patients in the research sample to the experimental and control groups for Experiment I proved to be valuable in dispelling the nurses' subjective assessment of patients' potential for toilet training. Many of the patients allocated to the experimental group were felt to be 'untrainable'. Two such patients were P 22 and P 28. Their

unexpected high levels of achievement resulted in a questioning by nurses of their subjective assessment of patients and the results of the experiment were seen as salutary warning. The early response to training of P 28 was doubtless at least partially responsible for the nurses development of faith in, and acceptance of, the study in its early stages.

The effectiveness of the toilet training programme in relation to many of the patients previously categorised by nurses as "incontinent and untrainable" questions the nature of the problem of 'incontinence' in mental defectives . It may be suggested that the prevalence of 'primary' incontinence is due to the absence of toilet training rather than being an incapacity directly associated with mental deficiency. In order to clarify the nature of the problem, the term 'incontinence' could be reserved for those cases in which toilet training had been unsuccessfully attempted. The term 'pseudo-incontinence' could be adopted to describe incontinence in a mental defective as yet untrained. This distinction in terminology might encourage nurses and others to appreciate that incontinence is not necessarily an inevitable incapacity associated with mental deficiency. Further, it identifies that the largest problem is a pseudo-problem, and is more related to the limitations of institutional care than to limitations of mental defectives. Another useful dimension of the problem is identified by Smith et al. (1975). They distinguish two groups of patients who may profit from behaviour modification toilet training. This first comprises "those who are actually incontinent" (i.e. unable to recognise or to respond to signals of a full bladder or bowel); and the second "those who, though not strictly speaking incontinent, manifest toileting problems in a wider sense." This is described as a "large group of patients who rarely, if ever, actually have an incontinent episode, but who are

heavily dependent upon staff for their toileting needs." Smith et al., in this grouping, draw attention to the need for recognition of toilet training as aiming for independent toileting.

Another important matter is raised by Smith et al. on a different subject. This concerns the procedure of behaviour modification toilet training. Two main points are made. The first is that empirical evaluation of various techniques used in establishing independent toilet behaviour is required:-

" ... It would seem that, although the techniques of prompting, fading and shaping are theoretically capable of producing new behaviours, an empirical study of the comparative feasibility and utility of these approaches would be of interest."

Their second point questions Gardner (1971) who comments that " .. reports ... have provided rich information to guide the technician in a toilet training programme ... ". Smith et al. purport:

" ... The current concept of validity of techniques is inadequate for the thorough evaluation of behaviour modification techniques in the institutional setting. There have been no controlled studies of different operant approaches to toilet training. The most basic such study required at the present time is a comparison of the relative efficacy of group toilet training as compared with individual toilet training."

The procedure of the present study was designed to accomodate individuals within an overall group programme and appears to provide a feasible procedure for implementation by nurses in a ward situation. The procedure involved the behaviour modification techniques of positive reinforcement, extinction, shaping, chaining, prompting, discrimination control and stimulus generalisation. There was no attempt to test the direct effects of individual techniques upon the modification of discrete components of toilet behaviour. In this, the present study provides a limited contribution to the development and clarification of the procedure of toilet training. The demand by Watson (1967) for "systematic determination of the relevant variables" is not answered. Some credibility to the multivariate procedure derives from the similarity of results obtained in the replication of Experiment I.

Some contribution to procedural detail is made by a full description of the procedure employed. The production of the Tape/Slide sequence on "Toilet Training" (Tierney, 1975) was undertaken in the attempt to provide details of the procedure developed. Whether or not these are sufficient to permit replication in other situations to obtain similar results will be investigated by following-up the utilisation of the tape/slide by nursing staff in other hospitals.

In the procedure no attempt was made to discriminate between faecal and urinary elimination as has been done in other studies. For example, Giles and Wolf (1966) specify:

> "Since bladder incontinence and bowel incontinence apparently are independent behaviours, it was felt that an attempt to modify both responses simultaneously would complicate the procedure. Therefore, only after some consistency of bowel control had been established, was urinating in the toilet reinforced."

Results in the present study show that, in the majority of cases, urinary continence was established before faecal continence. Contrary to Giles's and Wolf's opinion that simultaneous modification of both responses would complicate the procedure, it is suggested that it enhances the procedure. Urinary elimination has a higher response frequency than faecal elimination. This increases the possibility of more frequent positive reinforcement, and resultant strengthening of appropriate behaviour. This particular point is made to illustrate one minor contribution to the development of toilet training procedure from the present study.

The results of the assessments of patients' general level of funcioning (as on P-PAC) are particularly interesting. These were made to monitor any effects of the toilet training programme upon behaviours other than toilet behaviour. The result of singular interest is the incidental observation that, out of the 27 patients who improved by

toilet training, in 24 cases the period of greatest progress in general level of functioning coincided with the period of their involvement in one of the experimental toilet training programmes. Improvements in functioning occur in all classes of behaviour as evidenced in increased scores in each quadrant, section and level of the P-PAC. The greatest degree of improvement occurred in Experimental groups I and II in the 'self-help' quadrant, and the 'toilet and washing' section within this. The phenomenon observed is described as an 'acceleration of progress concurrent with behaviour modification toilet training'. Statistical analysis suggests this acceleration to have a causal relationship with the experimental influence. The finding suggests that there are generalised effects of specific training, and that this generalisation accrues during the period of intensive training. Evidence of this phenomenon is mentioned explicitly in the toilet training literature only by Baumeister and Klosowski (1965). They observed:-

> "One of the more interesting results concerned behaviour in aspects other than toileting. The subjects, aside from the difficulties encountered during the first few days of the program, generally became easier to manage. Moreover, some who had never fed themselves began to use utensils. Whether this fringe benefit was due to a more favourable and less distracting environment or whether it resulted from the direct efforts of attendants, it does suggest that specialized training programes might positively affect several areas of development."

Bensberg et al. (1965) and Kimbrell et al. (1967) note improvement in terms of social functioning on the Vineland Social Maturity Scale. Bensberg et al. comment upon the biggest gain in score occurring during the first month of training. Kimbrell et al. identify gains in social age, but no difference between mean gains of younger and older patients. They also comment that "films taken of the project at various stages of its development .. clearly depict changes in social responsiveness and physical development .."

The phenomenon identified in the present study and that of Baumeister and Klosowski is described for the purpose of this discussion as 'response generalisation'. The term generalisation in operant literature has been conventionally limited to the concept of 'stimulus generalisation'. Catania (1968) defines this as "the spread of effects of reinforcement in the presence of one stimulus to other stimuli that differ from the original stimulus along one or more dimensions." In a text dealing with this concept exclusively, Mostofsky (1965) outlines the various descriptions of stimulus generalisation by Hull (1943), Hilgard and Marquis (1940) and Miller (1950). He shows the descriptions to vary in their emphases upon the stimulus, the response, and the process.

The concept of response generalisation has arisen largely in relation to that of imitation. Baer and Sherman (1964) undertook a study to "show the function of certain social reinforcement operations in promoting responding along the dimension of similarity in behaviour." Three imitative responses (head nodding, mouthing and strange verbalizations) were established in young children by social reinforcement from a puppet. A fourth imitative response (bar-pressing), which was never reinforced, was found to increase in strength when reinforcement followed the other three imitative responses. Baer and Sherman note that bar-pressing has little physical or topographical resemblance to the other responses involved. They conclude that the finding is clearly produced by imitation and note that "there was no general increase of other observable activities."

While Baer and Sherman do not directly discuss the concept of response generalisation, the study is relevant in suggesting the usefulness of focussing, not only on singular responses, but on response classes (i.e. groups of responses which develop together).

Groups of responses may develop together even if each individual response is not directly reinforced. That this occurs in the behavioural development of normal persons is self-evident. The observations from the present study suggest that it may occur also in the behavioural development of mental defectives. The greatest generalisation effects are seen in relation to skills contained in the 'self-help' quadrant of the P-PAC. These skills are most similar in topography to skills of toilet behaviour, and it may be that response generalisation occurs most readily between highly similar responses. An alternative explanation might be that all improvements were in fact brought about by direct reinforcement, many types of skill and behaviour contributing to toilet behaviour. Whatever the cause, the phenomenon observed merits examination. The P-PAC as an evaluative tool is not designed for extensive group, quantitative statistical analysis and examination to look more closely at the generalised effects of training was not undertaken. (It is interesting to note that Cull (1974) analysed PAC data (on the P.A.C. 2 form) by an Elementary Linkage Analysis (McQuitty, 1957), to identify inter-relationships of items on the P A C 2.) This finding is considered to have implications for behaviour modification and its application to mental defectives, in suggesting valuable 'spin-off' effects of intensive and specific training.

## Discussion of Method

The adoption of a controlled two-group research design for the experiment is felt to have been advantageous, and to have combined well with the integral set of single-subject pre-post-tests. Adoption of a modification of the prototype experimental design in Experiment II appears to have been satisfactory. On the whole, the research design of the present study provided an elegant sequence of stages which

permitted a variety of inter-group, inter-subject and intra-subject analyses. It is regretted that an absolute baseline of elimination response rates was not obtained. It was not feasible to maintain the large number of patients involved out of nappies for the 30-day period of baseline assessment. Thus, a practical and reasonable decision was made at the expense of some loss of accuracy to the research data. This is one example of conflict which inevitably arises in clinical research; and compromise must be made between the ideal experimental situation and adverse effects upon the practical situation.

Gardner (1969) provides the major appraisal of the methodology of behaviour modification research. He advised the provision of the following conditions in such studies:- (i) direct and indirect measures of specific and general changes in behaviour; (ii) individual and group results; (iii) pre- and post-treatment evaluations and measurement of long-term gains; (iv) multivariate manipulation of the independent variables, particularly techniques. The method of the present study met, to a reasonable degree, the first three of these conditions. As has previously been noted, the fourth was not attempted. Herein lies the particular weakness of the method of the study.

The involvement of a control group in Experiment I allowed the effect of the experimental influence to be precisely evaluated. Post-experimentally, the experimental and control groups (previously matched) were found to differ on the dependent variables measured (incontinence, toilet behaviour, general level of functioning). These differences are attributed to the effects of the experimental influence. This involves the assumption that, during the experimental phase, control of environmental variables was maintained by their equal distribution across all patients and between the two groups. However, the strikingly similar results obtained by the experimental group (E II) in Experiment II

support a causal relationship between the experimental influence and post-experimental changes observed.

Within an operant conditioning theoretical framework, it is the causal relationship between the reinforcement and the response which requires to be tested by experimentation. The experimental influence in the present study is multi-variate, reinforcement providing only one variable. Thus, the design can be criticised and it must be acknowledged that various experimental effects may have been caused by one, or of any combination, of the following components of the experimental procedure:- (i) regular toileting; (ii) non-reinforcement of incontinence; (iii) reinforcement of continent elimination; (iv) removal of nappies; (v) various behaviour modification techniques.

Dingwall (1974) discounts the possibility that any of these is responsible for the experimental effects. He chooses to interpret the results as "the outcome of a series of interactions in which both nurse and patient participate." Dingwall, a medical sociologist, refutes the relevance of an operant conditioning framework as "patently inappropriate .. to (the)data". He comments in conclusion to his letter of criticism following publication of a report of the study (Tierney, 1973):-

> "It would be a pity if the growing body of nursing research which can produce work of this care and methodological quality should allow itself to be seduced by a theoretical approach which is becoming increasingly discredited and can surely only have appeal for its scientistic aura."

Criticisms of developments in nursing research in general and of "currently fashionable research into 'dirty work'" (such as incontinence) are explicated in detail further by Dingwall (Dingwall, Feb. 1974). Without specific reference to the present study, he reiterates:

" ... alternative explanations of the results (of such studies) are available in terms of alterations in the social life of the ward.

Such effects were first noted by Roethlisberger and Dickson in the Hawthorne studies. What is happening is that the meaning of the tasks for the staff is changing and their whole approach to the work is different ..."

In reply to Dingwall's initial letter, it was explained (Tierney, 1974):-

> " ... Mr. Dingwall's explanation does not account for the fact that the patients in the control group did not show behavioural change similar to those in the experimental group in the controlled experiment. It must be deduced therefore that this difference was due to the experimental influence ..."

Dingwall's initial letter was followed by several in reply, in addition to that of the researcher. Altschul (14 Feb. 1974) pointed out his unfortunate criticism of mental deficiency nurses in general as did Hunter (7 Feb. 1974). The latter suggested Dingwall's interpretation of results to be a "statement of the obvious", " an over-simplification". Hall (21 Feb. 1974) makes the useful point that the research was "not conceived to prove a theory, but to demonstrate an efficient procedure that is relevant to a most unpleasant chore undertaken daily by thousands of nurses." Walsh (28 Feb. 1974) suggests that: " A simple increase in staff-patient interaction cannot guarantee patient improvement without systematic application". (Copies of the full texts of correspondance arising out of the publication of results are contained in Appendix 4.)

Apart from attack on its theoretical basis, behaviour modification has been confronted with critical ethical and moral issues. These have been discussed, for example, by Miron (1968) and Ross (1974). The latter identifies three distinct issues which hold important legal and ethical implications:- (i) use of aversive conditioning; (ii) 'control' of behaviour; and (iii) selection of goals. The objectives and procedure of the present study were not thought to involve any potential ethical

or moral issues, and none ensued. The involvement of patients in the control group of the controlled experiment did not alter their management in any way. Any possible criticism that they were denied treatment is answered by their inclusion in the second training programme. A hospital 'ethical committee' was not in existence at the time of the study. Close supervision of the study was maintained throughout by the Physician Superintendent. However, it is recognised that behaviour modification may involve ethical or moral dilemmas. As a result of an inquiry into medical and nursing practices at Napsbury Hospital (H.M.S.O. 1973 ), it was felt that ethical guidelines for behaviour modification programmes should be made available. To this end a Committee was set up in 1973 under the Chairmanship of Professor Zangwill.

In reviewing literature of nursing research, the paucity of experimental study was noted as a feature in the fairly limited collection of clinical nursing studies. The present study can be classified after Diers (1972) as a clinical study which both attempts to solve a practical problem and to contribute to knowledge. The experience of undertaking this experimental nursing study has strengthened the conviction of the researcher that experimental method provides support to evidence and is feasible within a clinical nursing situation. No particular problems arose in the implementation of the research design selected. This experience prompted the publication of a paper on 'research at ward level'. This attempted to identify some of the problems of clinical nursing research, which were considered before and during the present study (Tierney, 1974). Hayward (1975) considered that the results of his study demonstrated the feasibility of ward-based experimental research in nursing. The theoretical framework and experimental foundations of behaviour modification research provide a relevant basis for nursing research into behaviour modification in mental deficiency

nursing. It is sometimes said that behaviour modification and research 'depersonalise' patients. Abdellah and Levine (1965) are clear in their statement that "no single concept has greater significance for nursing research than that of viewing the patient as a person." If this report of the study, or description of procedure, prohibit such an impression being gained, then it must be corrected. The procedure was orientated to the needs of individual patients and, in the title of Abdellah and Levine, the aim of the study was not research as an end in itself, but 'Better patient care through Nursing Research'.

## The Study - and behaviour modification in mental deficiency nursing.

Although a nursing study, results have been related, appropriately, primarily to patients. It remains to discuss the study in terms of the involvement of nursing staff and its relevance to behaviour modification in mental deficiency nursing.

The characteristics of the nursing staff population, its low nurse:patient ratio and rapid turnover have been described previously. The nurses had no previous experience in applying behaviour modification techniques. That they learned to do this effectively in the toilet training programme has been noted. One objective of the study was to evaluate its effectiveness and practability by monitoring its effects on the pattern of nurses' work activities. Observations of the nurses' work activities showed that the majority (68.78%) concerned 'physical' nursing and a minority (10.75%) were 'therapeutic' in nature at the pre-experimental assessment. Following Experiment I, some reduction in the incidence of 'physical' activities (to 64.74%) and an increase in that of 'therapeutic' activities (to 18.23%)

was evident. The toilet training programme did not affect the high proportion of all nursing activities which were determined by patients' elimination. This amounted to 38.98% and 37.80% at the pre- and post-experimental assessments respectively. However, some redistribution of activities within this had taken place. Activities related to the management of incontinence decreased in frequency, from 21.97% to 15.20%; and those concerned with toilet management increased from 17.01% to 22.60%

However, a pertinent comment was made early in the development of the study at a Scottish Hospital Centre Conference (Tierney, 1972) by the researcher:

> "Statistical results of this study can indicate such staff factors as instability or insufficiency, but will never indicate the factors responsible for the implementation and, hopefully, the success of this study - these of the diligence, patience and enthusiasm extended by those nurses who have been involved."

This remains the researcher's lasting impression of the nurses' involvement. However, this positive and productive stage was preceded by one of hostility and uncertainty. The nurses were doubtful about the study and resented the intrusion of the researcher. Typical comments voiced to the researcher initially were:- "Most of the patients are too low-grade to be trained"; "What do you think we've been trying to do for years? ... If we can't potty train them, neither can you"; "We've no time to take part in fancy research - we've got a job to do." Despite this, nurses did co-operate in data collection of Assessment 1 and appeared to feel obliged to do so. Interest in the study gradually developed, and the nurse training programme was well received ("Well, at least it's a bit of a change, all this").

The full co-operation and support of the nurses was gained in the initial weeks of Experiment I. Nurses had been unwilling to accept evidence that behaviour modification toilet training had been shown to

be effective with mental defectives. When first-hand evidence became available, this reservation was dispelled. It was the early response of one patient (P 28) which was responsible for this. The nurses had felt her allocation to the experimental group to be futile, and considered her to have no potential for training. From that point, the nurses became increasingly committed to the programme, defensive of it in response to criticism from other wards in the hospital, and keen to develop their expertise and knowledge further.

An interesting contrast to the nurses reservations about Experiment I was their enthusiasm about Experiment II. They approached its implementation in a totally different way. Allocation of the control group as the experimental group was favoured in preference to subjective selection. Doubts were expressed about the prospect of a heavy workload with maintenance training for the first experimental group, but these did not mitigate against its implementation. Data collection was considered to be essential and carried out consistently. In addition, the Ward Sisters and the nurses were keen to assume greater responsibilities and welcomed a diminished role of the researcher. Whereas, in Experiment I her presence was felt to be essential, expressions of confidence in their own ability were frequent ("You take the weekend off, we'll manage O.K. ... ").

Improvement of staff morale was evident during the study. Dayan (1964) and Levine and Elliott (1970) noted this feature in their toilet training studies. Fewtrell (1973) notes the opportunity for more therapeutic nursing activities as incontince is reduced.

Ellis (1963) mentioned the importance of careful training and selection of staff. Baumeister and Klosowski (1965) suggest that some nurses are not flexible enough to be effective in a training role which demands a change in attitude. Most of the

writings on the subject (Peck, 1973; Hall, 1973; Kiernan, 1973) stress the importance of nurse training. Nurses were not specially selected for the present study, but were trained for their involvement. The majority were supportive of the study and were observed to show a high degree of accuracy in relation to practical techniques and knowledge of patients' training requirements.

Differential reinforcement of nurses' behaviour in the study was employed by the researcher. This strategy has been shown to be effective. Panyan, Boozer and Morris (1970) provided feedback to attendants as a reinforcer for applying operant techniques. Kazdin (1973) cites examples of various reinforcers for staff for successful running of individual training programmes.

The behaviour modification toilet training programmes were considered by the nursing staff involved to be effective and practicable. This provides an important objective and relevant appraisal of the study, and was discussed by one of the Ward Sisters at a study day for nurses on behaviour modification (Nelson, 1974). She explains that the study:

"was greeted with very mixed feelings among staff" and adds a personal comment which is interesting:

> "When I first heard about the toilet training programme using behaviour modification I was not at that time working in the ward involved, but I had heard stories about the children being given smarties when they sat on potties and passed urine and quite frankly I thought it was a bit of a joke ! ".

The paper continues....

> "We did achieve results, not in every case, but it most cases, and this was very encouraging for the nurses ... side benefits emerged for both children and staff ... As far as the nurses were concerned, I think it gave them a new interest in their job ... there was great excitement when so- and-so had been dry all day ... they realised that they could do more for the children than the basic custodial care that is usually accepted, and that perhaps a child might just be able to do something that previously we would never have suspected, mainly because noone had ever tried or realised there was any potential of any kind there."

In conclusion, Sister Nelson comments upon the knowledge and aptitude which student nurses seconded to the ward have shown in behaviour modification, and upon similar activities which have been developed in the experimental situation subsequent to the present study:-

> "... In July this year (1974) a behaviour modification feeding programme was started by the psychologist and our Nursing Officer. Two children are so far feeding themselves. Here again, every nurse is involved and interested, and knows exactly what is being done. Even if they don't always agree with and sometimes grumble about it, the interest is still there. I think I can speak for all of them when I say that although it is hard work, sometimes troublesome, from the results we have to show we think it has been worthwhile."

This testimony adds an important dimension to the evaluation of the experimental toilet training study. That the nurses themselves see it to be an acceptable and effective innovation provides some substance to the view, that behaviour modification in general is relevant in mental deficiency nursing; and that behaviour modification toilet training in particular can be both practicable and effective in the patients' normal ward environment when implemented by nursing staff.

The nurses' own favourable evaluation of the results obtained in Experiment I which was directed by the researcher, and in Experiment II which was directed mainly by the nurses themselves, helps to reduce the possibility of a 'self-fulfilling prophecy' (Merton, 1948) operating in the present study. However, the related phenomenon of an 'experimenter effect' (discussed for example, by McGuigan, 1963; Rosenthal, 1964; and Kintz, Delprato, Mettee, and Persons and Schappe, 1965) requires to be considered. This recognises that characteristics of the experimenter may influence or vary the effects of the manipulation in an experiment. The phenomenon is most relevant in experimental research involving subjects who are susceptible to insidious influences of experimenter cues. It is probable that an experimenter effect could not have influenced the patients in the present study on account of their mental deficiency. However, the experimenter (the researcher) may have influenced the nature of the nurses' implementation of the procedure, and was obviously influential in respect of the provision of nurse training and of some development and change in nurses' attitudes. Thus, an important test of the validity of the results of the present study would be provided by its replication by a different experimenter in another ward situation.

There was no attempt made to select nurses specifically for the implementation of the toilet training programmes. Cursory evaluation of the nurses' technical ability in implementing the stipulated procedure suggests that there was no difference in level of ability between the trained nurses and untrained nursing assistants. Gardner (1972) showed that there were no differences between experienced and inexperienced (newly-recruited) attendants in terms of knowledge of behaviour modification or attitudes towards working in a behaviour modification area in a small exploratory study related to the selection of non-professionals for behaviour modification

programmes. The experience of the present study does not uphold the recommendations of Ellis (1963) and Baumeister and Klosowski (1965) that staff must be carefully selected for involvement in a behaviour modification toilet training programme. However, in contrast to Gardner's finding, it appeared in the present study that the older nurses with longer experience in mental deficiency were more sceptical of behaviour modification initially than the group of young, temporary, untrained nursing assistants. However, there was no relationship between initial scepticism and later enthusiasm. Indeed, the nurse most resistant to the study at its onset eventually became the most enthusiastic and committed member of the nursing staff. The development of a positive attitude to behaviour modification after initial sceptimism is a transition which has been described, for example by Stenger and Peck (1970), in the literature.

Hall (1973), from a survey of behaviour modification programmes in G.B., suggests that some degree of control in selecting and retraining staff is important. In the absence of relevant and tested selection criteria the researcher would not endorse the need for selection on the basis of experience in the present study. However, there is a definite need for research into this aspect as both Hall (1973) and Gardner (1972) indicate. Hall discovered (in behaviour modification projects in mental deficiency hospitals) the nurse: patient ratios to vary from 1: 2.5 to 1: 24 (mean of 1: 8.4). The mean nurse: patient ratio of 1: 9.1 in the present study shows staffing to be about average on this basis. The nurses felt that staffing levels could not be lower to allow the programmes to be implemented adequately. It is interesting that the overall slightly poorer results of toilet training were obtained in Experiment II. During this phase of the study the total staff complement was at its lowest, the nurse:patient ratios

were poorest (mean of 1: 14.05), and there was the highest percentage of shifts not worked. However, the results of the study clearly refute the general claim of mental deficiency nurses that training programmes just cannot be implemented in areas where poor staffing persists. Perhaps a more important consideration than staffing levels is to attempt to maintain at least a small core of permanent staff on a ward in which a long-term programme (as behaviour modification inevitably is) is running. The high turnover of the staff population in Lewis Ward was a particularly difficult feature and, as detailed, only seven nurses of the initial population remained in the ward at the end of the period of the study. A high turnover is particularly problematic in respect of ensuring adequate staff training. The researcher would support the views of Hall (1973), Kiernan(1973) and Peck (1973) that training is an essential prerequisite to the effective application of behaviour modification techniques.

In the present study, no attempt was made to develop a tool to evaluate skill in applying behaviour modification techniques, and those peculiar to toilet training in particular. This is an area of research which requires to be developed alongside the development of methods of teaching nurses (and others) the principles and techniques of behaviour modification. Gardner, Brust and Watson (1970) describe a scale developed to measure proficiency in applying behaviour modification techniques. The authors note that proficiency can be evaluated by direct observation of the trainer in action or by using patients' progress as an indirect indicator of trainer effectiveness. The Training Proficiency Scale (TPS) developed is said to provide " a fairly short, efficient, reliable and valid method of assessing an individual's effectiveness in using behavior modification techniques."

Gardner has also contributed to study related to methods of teaching behaviour modification to ward attendants. As in the present study, most teaching programmes use a combination of lectures and practical demonstrations (for example, Watson, Gardner and Sanders, 1971). Gardner (Gardner, 1972) attempted to evaluate the effectiveness of role play and lectures in a staff training programme. He found that role play was more effective in teaching behaviour modification skills, while lectures were more effective in teaching behaviour modification principles. This finding is supported from the experience of the present study in which practical demonstrations and supervised practice obtained the nurses' attention and interest to a much greater extent than the formal teaching sessions.

There is a paucity of analyses of methods of teaching behaviour modification in the literature to date. Hall (1974) found that a variety of methods were in use in behaviour modification programmes ongoing in the U.K., and warned that the most common methods may not be the most effective. Poser (1967), Ernst (1971) and Bennessi (1972) provide some information and opinion upon the training of behaviour therapists. There is general agreement that knowledge and competence is required in at least five areas:- skills in observation, behavioural analysis, interpersonal management, specific therapy techniques and in treatment assessment. Adequate and continuous assessment with sufficient feedback is stressed to be very important in training. Mussante and Naffar (1973) report that trainees felt primarily that a training programme should not contain too much theoretical knowledge, but rather provide specific training in basic principles and common techniques. This finding can be seen to be relevant to the training of nurses and, in the experimental study, nurses responded best to teaching directly relevant to behaviour modification toilet training.

Various models of possible methods of nurse training are now becoming available. Kiernan and Riddick (1973) provide an example of an integrated practical and theoretical course in which the teaching sequence is flexible to allow for individual differences between trainees to be accomodated. Epling, Walsh and Gathercole (undated) report on an experimental nurse training course in behaviour modification, the procedure of which is based on behaviour modification principles. Keller (1968) evaluated a similar procedure and, since then, several investigations have demonstrated the superiority of this approach over more conventional teaching methods (McMichael and Corey, 1969; Sheppard and MacDermot, 1970). The introduction of nurse training in behaviour modification, based on these principles and techniques itself, would be interesting to investigate further. The general development in teaching of the use of audio-visual aids is another possibility worthy of exploration. The use of films and slides in the training programme integral to the experimental study was found to be helpful. It is hoped that the Tape/Slide sequence developed will provide nurses in other situations with information about behaviour modification toilet training and it will be interesting to assess this medium as a possible teaching method related to nurse training in behaviour modification.

In the present study it was not feasible to systematically explore in detail the nurse's role in behaviour modification or the related subjects of selection, training and evaluation of proficiency. However, these subjects could be most usefully investigated in future research concerned with behaviour modification in mental deficiency nursing.

## Conclusions

1. Whether or not the behaviour modification toilet training programmes were effective cannot be stated in terms of any singular conclusion. However, the two programmes (Experiments I and II) effected reductions in the prevalence of incontinence and in the amount of linen used due to incontinence in the experimental situation; and resulted in 27 of the 35 patients involved improving in terms of a reduction in degree of incontinence and in acquisition of toilet skills. These results compare favourably, where comparison is possible, with those obtained in previous studies. The present study provides further evidence in support of previous claims that behaviour modification toilet training is an effective method by which to toilet train incontinent mental defectives.

2. In particular, the present study illustrates that behaviour modification toilet training, previously undertaken almost exclusively by psychologists in the U.S.A., can be effectively implemented by nurses with a group of mental defectives in their usual ward environment. That ward environment need not contain special resources or advantages or even a stable and/or high nurse:patient ratio. Thus, it is suggested that behaviour modification toilet training is a suitable method by which the nursing problem of incontinence in mental deficiency hospitals in this country could be approached. The procedure developed effected highly similar results in a replicative experiment and, in general terms, is considered to have generality in situations similar to the specific experimental situation in which the study was conducted.

3. In the present study, toilet training aimed to develop independent toileting by mental defectives. This objective of toilet training is stressed to be important and it is considered that habit training (or conditioning of the elimination response) is an insufficient solution to the nursing problem of incontinence in mental deficiency. Further, it is suggested that incontinence in mental defectives is probably more commonly due to lack of training than to neurophysiological defect. A majority of the patients who improved as a result of toilet training in the present study had previously been considered by the nursing staff to be 'untrainable'. No strong association between patient characteristics and improvement (or non-improvement) after toilet training was identified in the present study. It is concluded that it is not relevant for nurses to attempt to select patients for toilet training, and that a mental defective could be considered to be incontinent only after repeated efforts to toilet train him have failed.

4. Previous studies have failed to provide an analysis of toilet behaviour by functional analysis in detail sufficient for precise behaviour modification of this highly complex behaviour. In the present study some attempt was made to provide such analysis and a 'model for shaping toilet behaviour' developed on the basis of observed response topographies in toilet behaviour. Toilet behaviour is conceptualised as a sequence of responses. These are temporally related with pre-elimination toilet skills following a physiological stimulus and post-elimination toilet skills following the elimination response itself. Each of these responses can be considered spearately, and broken down to provide successive approx-

imacions to the final target behaviour which can be established by behaviour shaping techniques. The 'model for shaping toilet behaviour' was found to be a relevant and directive framework for the toilet training procedure. In addition, it provided a method for evaluation of the acquisition of toilet behaviour. This evaluative measure complemented that of the measurement of elimination response frequency by which establishment of the elimination response (and reduction in incontinence) was measured. These closely related methods of behavioural analysis, modification and evaluation in the procedure developed for the present study are considered to provide some required sophistication of methodology in behaviour modification toilet training studies which has been so noticeably lacking in the literature to date. Further development within this area is deemed to be essential in future research. Another critical area of knowledge which requires to be developed alongside this concerns the testing of the specific effects of the individual variables within a 'behaviour modification toilet training procedure'. This requirement has been noted in the literature and is endorsed here.

5. The problem of regression in toilet training has been shown to occur in the literature and was investigated by long-term follow-up evaluation in the present study. Regression to pre-training level of performance did not occur in the research sample involved. A tenuous link between the use of a controlled and isolated environment and the occurrence of regression was surmised from the literature. Results of the present study would support the opinion of other researchers that regression may be less likely (and stimulus generalisation more probable) when training is carried out in the

patients' usual living environment. The importance of maintenance training after behaviour modification toilet training has been implemented is stressed as being essential to maintain the effects of training and to effect further improvement. Long-term evaluation has been neglected in many studies reported and is considered to be a requirement in subsequent studies in order that the long-term effects (improvements and problems) of toilet training can be clearly ascertained.

6. The finding that improvements in behaviours other than toilet behaviour occurred in patients involved in the toilet training programmes adds to similar evidence provided by a few previous studies. In this context, the interesting finding is the phenomenon that an acceleration in progress (in terms of general level of functioning) coincided, in the majority of cases, with the period of intensive toilet training (i.e. the experimental phase). That intensive behaviour modification training in one specific area appears to produce generalised effects is a finding with important implications for nurses in demonstrating a useful 'spin-off' effect of behaviour modification with mental defectives. It is suggested that this phenomenon discovered may be explicable within the developing concept of 'response generalisation'. The inclusion of comprehensive behavioural assessment and monitoring in behaviour modification research is considered to be an important factor in research design in the future to allow the phenomenon of response generalisation in the learning processes of mental defectives to be studied and analysed.

7. The study provided the opportunity to investigate the subject of behaviour modification in mental deficiency nursing through a

specific behaviour modification project which was implemented by nurses, and directed and researched by a nurse-researcher. The nurses involved were not specially selected and had no previous experience of behaviour modification. If the results of the toilet training programme can be taken as a measure of the nurses' proficiency in implementing the procedure, then it is evident that the current opinion that nurses can be effective behaviour modifiers is upheld. Initially, the nurses were highly critical and sceptical of the study and of behaviour modification. However, in the course of the study, they developed a positive attitude towards behaviour modification. This change in attitude appears to be typical (as was identified in the survey study) and, as evidenced in the present study, seems to be dependent upon first-hand experience of demonstrated effectiveness of behaviour modification techniques. The nurses themselves concluded the toilet training programmes to be effective, the procedure to be better than their own traditional habit training regime and the results to be above their expectations. Their gained enthusiasm about, and commitment to, behaviour modification as an adjunct to traditional nursing methods is demonstrated by their continuing application of behaviour modification techniques within the experimental situation. These developments clearly show that the general opinion of nurses in mental deficiency that such patient training cannot be undertaken due to lack of time and shortage of nurses is unfounded. There was no attempt to maintain a minimal and/or stable nurse:patient ratio in the study. Observation and analysis of nurses' work activities in the experimental situation pre- and post-experimentally showed that the improvements effected by the toilet training programme did not result in a decrease in work activities related to patients' elimination. However, there was a redistribution within these activities

with the frequency of those related to management of incontinence being reduced and of those related to toilet management being increased correspondingly. Thus, the toilet training study did not result in a reduced workload for the nursing staff but, probably just as important, did result in some transition from physical nursing care to therapeutic nursing care. Aspects of nurses' involvement in behaviour modification require to be investigated through further research. The subjects of selection, training, evaluation of proficiency, staffing levels and attitudes of nursing staff are all relevant for consideration in future studies to contribute to knowledge relevant to the development of behaviour modification in mental deficiency nursing.

## SECTION III:

The Survey Study: Study of nurse involvement in the application of behaviour modification techniques to patients in mental deficiency hospitals in Scotland (1974).

Chapter 14: The Survey study - Introduction, literature review and method.

Chapter 15: The survey study - Results and discussion.

CHAPTER 14:

## The Survey Study - Introduction, Literature Review and Method:

### 1. Introduction

During the course of undertaking the experimental study, the researcher had gained knowledge, through personal contact and conferences, of several behaviour modification programmes being implemented by, or involving, mental deficiency nurses. More comprehensive information about behaviour modification programmes became available from the initial survey conducted by Hall (1973). The researcher was a respondent in this survey by postal questionnaire. As was stated in the Introduction (Ch. 1), the need for more complete information pertaining to the development of behaviour modification in mental deficiency nursing in Scotland provided the impetus for the present study. In particular, the absence of nurse training in behaviour modification (at basic and post-basic levels) had been acknowledged and it seemed necessary to find out, in order to identify training requirements, what kind of involvement of nurses had been developing and what problems and needs were perceived by nurses. As indicated in the review of literature on behaviour modification in mental deficiency nursing (Ch. 2), most of the related discussion has been forwarded by psychologists. The views of nurses on developments, ultimately affecting them, were badly needed. In the context of the recommendations of the Briggs Report (H.M.S.O., 1972), the potential of behaviour modification as one means of strengthening the therapeutic role of nurses was seen to hold new perspectives. Evidence of the relevance of this approach in nursing was required. In investigating the subject of the present research it appeared that to determine the current nature and extent

of nurses' involvement would add a complementary general dimension to that provided by the specific experimental study undertaken. For reasons of time and economy, the study was confined to mental deficiency hospitals within Scotland

## 2. Literature Review.

Surveys of behaviour modification programmes reported in the literature were reviewed to identify methods employed and information obtained. The few studies identified in the literature are relevant to report.

Liberman (1968), and Stenger and Peck (1970), provide information about behaviour modification programmes in the U.S.A. Turton and Gathercole (1972), Gathercole and Rucker, Eds. (1972) and Hall (1973 and (1974) provide information about behaviour modification programmes in the U.K. and Eire.

Liberman, a psychiatrist, describes reinforcement therapy programmes in operation at seven mental health facilities in California in terms of their accomplishments, problems and challenges. The study was carried out by visits to the projects concerned, which included four token economies and four individual projects involving shaping or extinction procedures. Discussing accomplishments, the author comments that:-

> "The effectiveness of operant conditioning procedures has been amply documented in the literature. However, personal contact with these procedures brings alive and emphasises the meaningfulness of accomplishments described more dryly in the research reports".

He suggests, as a further indication of effectiveness, the high morale and convictions of the nursing staffs. Examples are given of the importance of staff co-operation as aiding success, this apparently enhanced by prior training and conference. However, he notes that "considerable suspiciousness and hostility toward the innovative reinforcement methods has been encountered by almost every

project from administrative hierarchies." From his survey, the author also suggests that both ward -wide and individual models can be effective; that escape from contingencies often occurs; that only a small proportion of patients do not respond well to reinforcement contingencies; and that there is incongruence between therapeutic hospital and community settings.

Stenger and Peck, both psychologists, provide a survey of all Veterans Administration health-care facilities to identify existing token economy programmes, and to obtain information about their organisation and operation. Twenty-seven programmes (in 20 different hospitals), involving 935 patients, were studied, using traditional survey methods. They found that the day-to-day operation of programmes is almost exclusively the responsibility of nursing staff; the importance of having a staff member knowledgeable about relevant behavioural principles was stressed; and that the systematic orientation of patients to programmes was routinely done. The importance of a continual flow of information and demographic data about patients was acknowledged, although only about half of the projects tabulated or processed this. Respondents supplied four types of information about the impact and value of the programmes - judgements, anecdotes, outcome data and research results. In general, the reaction of patients was favourable as expressed in one response: "The uncertainty that patients feel on traditional wards about their prospects is replaced with a definite awareness of what they can do and the assured benefits that will accrue." One response to illustrate the overall favourable and positive attitude of nursing staff is given:-

> "At first their reaction was skeptical, not enthusiastic, but they have seen definite observable changes in patients thought

> to be hopeless ..... Feedback from staff is that nursing personnel learn to sharpen their observations and enjoy a framework in which there is a definite structure and definite goal for each patient."

Amongst identified recurrent data is the beneficial effect of token economy on other concurrent treatment modalities; a reduced need for medication; the consistent development of (both specific and general) desirable behaviour; and the reduction of nonadaptive and bizarre behaviour. The authors suggest that their evidence of the effectiveness of the approach supports the need for comprehensive short- and long-term research data.

Turton and Gathercole, also psychologists, describe some of the major token economy projects in the U.K. and Eire at the time of the study, (1972). Six projects are described on the basis of visits to the four psychiatric and two subnormality hospitals concerned. The size of patient groups varied from 7 to 35, individual ages being within a range from 17 to 70. In four cases the project director was a psychologist, in one a psychiatrist, and in one a nurse; and in all cases the projects developed from a modest beginning. Staff training varied from an intensive two-month programme to one spread over eighteen months. An interesting point is made referring to the anomalous position of token economy within the current transition from custodial to therapeutic care in that:

> "A token economy requires considerable control of reinforcers by staff which paradoxically appears to fly in the face of the new mood ... hospital authorities are caught in a dilemma: on the one hand wanting to avoid possible aversive consequences of a token economy ... on the other wanting to do the best they can for the patients ..."

In discussing patients' money in the context of token economy, it is concluded that "this does not raise a large problem for token schemes." A comparison is made between token economy and traditional reward and

incentive schemes, suggesting commonalities but weaknesses of the latter approach. In conclusion, the need for appropriate training of psychologists is stressed.

Short accounts of eleven behaviour modification programmes in Britain are provided by Gathercole and Rucker (Eds.), (July/Sept. 1972). These accounts, while not including detail or discussion, do provide an indication of the range of behaviour modification activities in a variety of settings. Six of the accounts refer specifically to token economy programmes, and the others to small-group or individual programmes utilising behaviour modification techniques. Most of the programmes mentioned involve both psychologists and nursing staff. These accounts were provided in response to questionnaires sent out early in 1971 by the Editors, and subsequent issues of the 'Behaviour Modification Newsletter' include more detailed accounts of these, and other, programmes.

The first attempt at a more comprehensive survey of behaviour modification activities in this country was undertaken by another psychologist, Hall (1973). A postal questionnaire method of survey was employed. The sample involved all hospitals known to be planning or operating a behaviour modification project. Responses were obtained from 21 hospitals relating to 28 projects. (This total included three studied by Turton and Gathercole and 8 by Gathercole and Rucker.) The survey aimed to gain data on the functioning and control of projects. Questions related to the general nature of the project; the involvement of nursing staff; communications; psychological supervision; and the control over categories of reinforcer. Of the 28 projects, 16 were token economies; 3 were (non-token) operant conditioning programmes; and 3 others were not grouped in either category. Almost exactly half

of the projects related to psychiatry, and half to mental deficiency. The patient groups varied in size from 8 to 51 (mean of 18.6 in psychiatric projects, and of 17.0 in mental deficiency); the number of patients per nurse varied from 2 to 25 in psychiatry (mean of 9.3) and from 2.5 to 24 in mental deficiency (mean of 8.4). Twenty projects had some degree of selection of patients, but only 6 had adequate control over nursing staff. Hall suggests that some degree of control in selecting and retaining staff is important. Information on the training of nurses, the involvement of psychologists, and the reaction of the rest of the hospital to the project all shows great variation between projects and no firm conclusions are made.

Following this survey, and related to developments within the author's own clinical setting, Hall (1974) reports findings of another similarly conducted survey to establish present patterns and problems of the training of nurses in behaviour modification. A postal questionnaire covered the general nature of the training course; selection of nurses for training; the aims, organisation and content of courses; methods of teaching; and methods of evaluation of courses. From a sample of 44 hospitals, 37 questionnaires were returned and, of these, 33 analysed. 18 related to psychiatric hospitals and 14 to mental deficiency, with one special hospital. As with the previous survey described, wide variations in response occur in relation to many of the questions. Courses described vary from 'appreciation courses' to specific training in preparation for practice. Little evidence is provided of choice being possible in the selection of nurses for training. Hall states that this "is particularly serious when nurses are being trained for work in a specific situation." A variety of professions were involved both as teachers and learners on courses,

psychologists being the largest single profession involved as teachers, and nurses the largest as learners. Courses in psychiatric hospitals were, in general, better staffed than those in mental deficiency hospitals but in neither was there much scope for individual teaching sessions. A wide variety is seen in the topics and the methods of training courses. There is little evidence of systematic evaluation of training. In conclusion, guidelines, which might make training in this area more effective, are forwarded and these include: (i) that teaching materials must be appropriate to the situation; (ii) that the most effective methods are not necessarily the most common; (iii) that evaluation is essential; and (iv) that it may be necessary to obtain financial support for training courses.

These survey of behaviour modification activities, both in the U.S.A. and U.K., provide some useful historical, anecdotal and statistical data. They suggest some of the similarities of development and problems of behaviour modification in the separate countries. However, due to the highly selected and specific samples involved, and to the diversity of the characteristics studies and the various survey methods adopted, the data cannot be regarded as either conclusive or representative.

The two larger studies undertaken by Hall provide more detailed statistical data than those previously gathered. The first provides a description of current ward behaviour modification projects, and the second of nurse training. Both studies have several limitations in their relevance to the present research which require to be noted. Firstly, the samples considered are selective and were not scientifically chosen to provide representation of the total. Secondly, the samples involved both psychiatric and mental deficiency hospitals and, while

separate data are often available, those aspects peculiar to mental deficiency are not studied in detail. Thirdly, the survey method adopted involved the use of semi-structured questionnaires which were not entirely successful in eliciting either comprehensive quantitative or qualitative data because of the diversity of the characteristics of projects involved. Fourthly, there is implicit in the second study an assumption that the first highlighted the factor of nurse training as imperative to the success of behaviour modification programmes. This assumption, supported by other suggestions of this nature, has not been substantiated by empirical data and may have resulted in a false presupposition of the design and analysis of the survey on nurse training. A fifth limitation of Hall's studies is that they do not focus on nursing, but merely include this in the context of a project rather than in the specific context of nurse involvement and nurse education. It is therefore difficult to draw out data related to the subject of this research.

Review of these available studies supported the recognition of a need to undertake a comprehensive survey of nurse involvement in the application of behaviour modification techniques to patients in mental deficiency hospitals. The present study was developed to (i) ascertain the nature and extent of nurses' involvement in behaviour modification; and (ii) to examine, in particular, the provisions made for training nurses for their involvement.

## 3. Method

Initially it was proposed to undertake the survey study by means of a postal questionnaire and a follow-up observational/interview study in a small sample of respondent hospitals with on going behaviour modification activities involving nurses. However, the results of a pilot study using this method suggest certain inherent limitations. It

was finally decided to determine the location of behaviour modification activities by means of a brief postal questionnaire, and then to collect data first-hand by visits to all identified locations.

The pilot study: A postal questionnaire was designed. This included questions within 10 sections:-

1. General characteristics
2. Initiation of the programme
3. Programme design
4. Nursing staff
5. Programme Implementation
6. Nurse training
7. Programme evaluation
8. Communication
9. Programmes completed or ceased.
10. Comments.

Selection of topics and questions within these sections was made largely from examination of the content and findings of those studies reviewed and from experience gained in the experimental study.

The pilot study was undertaken at the end of 1973. It aimed to pilot the questionnaire as a research tool and obtain feed-back as to its content and presentation from individuals experienced in behaviour modification. The pilot study did not attempt to act as a pretest.

The sample of the pilot study consisted of four hospitals in England (i.e. outwith the target population of the main study) in which more than one behaviour modification project involving nurses was under-way, and in which the psychologist involved was known to the researcher. Three of the hospitals were mental deficiency hospitals and the other was a psychiatric hospital. This arrangement was preferred to include the range of behaviour therapy techniques and programme design, while concentrating on the specialty of the research. Each of the four hospitals was asked to complete two questionnaire schedules for each of two on-going behaviour modification programmes. One schedule was to be completed by the psychologist and the other by the senior nurse of the ward

concerned. This duplication was intended to allow for any discrepancies in the response by those two professions which were anticipated to be the principal respondents to the main study. In addition, the respondents were asked to comment freely on the questionnaire, both in relation to programme concerned and in general.

A total of 10 questionnaires was returned, the respondents being most helpful in their comments. These were studied in detail although no attempt was made formally to analyse the data.

Several points emerged from this study questioning the suitability of the questionnaire for use in the main study.

Judging from the responses obtained, and the added comments of the respondents, the questionnaire was generally suitable in its relevance, scope and detail. It appeared to be a satisfactory tool for obtaining the information required.

Each of the four hospitals commented on the excessive length of the questionnaire, but did not feel it could be shortened.

The use of the term 'programme' throughout the questionnaire prompted uncertainty on several accounts. Several of the wards had more than one programme operating at that time. It was not clear whether a separate questionnaire was required for each, in which case much duplication of information would be presented from one ward. In other cases, it was uncertain what exactly constituted a 'programme':- whether the term referred to a group approach dealing with a multiple target behaviour, or to an individual treatment of one or more targets, or to a programme involving several patients but confined to a single target behaviour. Such difficulties had been anticipated from the researcher's own uncertainty when a respondent in Hall's survey.

The use of the present tense in questions posed difficulty. This limited the accomodation of detail on changes and developments

which inevitably occur in any flexible, progressive patient training programme. For example, questions related to nursing staff levels dictated a rather static response; those related to nurse training limited data on initial training and nurses involved at that stage.

The attempt to gain data on attitudes and attitude change in nurses was criticised by two respondents (psychologists) on account of seeming inappropriate in the context of behavioural data. It was suggested that observation of, and conversation with, nurses would be more fruitful methods of gaining such data.

A postal questionnaire method of survey for the proposed study seemed limited on the basis of data and comments obtained from the pilot study. In addition, the time seemed inappropriate for such a method in view of industrial action then taking place in the nurses' dispute over pay negotiations and the commitments placed on N.H.S. nursing staff by the recent reorganisation of the N.H.S. The Zangwill Committee (on ethics in behaviour modification) already had a large-scale postal questionnaire survey underway. All of these reasons suggested that response to another similar survey might be poor and the questionnaire method anyway seemed limited in eliciting the desired data. It was decided to conduct the study by identifying the locations of nurse involvement in behaviour modification by a brief postal questionnaire enquiry, and then to follow-up all behaviour modification activities identified by visits to the hospitals concerned.

The survey study: On the basis of the above decision, the study was conducted in two stages. It was undertaken late in 1974 and completed over a period of 5 months.

(i) Stage One: This required to identify the hospitals in which nurses were involved in behaviour modification. All mental deficiency hospitals in Scotland were included in this stage of the survey. The

hospitals included comprised those classified as 'mental handicap hospitals' in the Hospital Year Book (1973). The State Hospital was excluded. Twenty-one hospitals were identified. One is a Voluntary Hospital and all others are N.H.S. hospitals. Of the 21 hospitals, 6 are for adults only; 14 for both adults and children; and 1 for children only. The number of beds per hospital ranges from 20 to 1565. The hospitals are situated geographically within 11 of the 15 Health Boards in Scotland.

Communication was made with the hospitals (N = 21) through the senior nurse administrator and comprised a letter of explanation and a brief questionnaire, (see Appendix 5). The questionnaire aimed to establish (i) whether nursing staff were, had been or intended to be involved in behaviour modification; (ii) roughly the nature and extent of involvement; (iii) whether or not participation further in the study would be considered. No definition of the term 'behaviour modification' was offered, but the terms 'behaviour therapy', 'operant conditioning' and 'token economy' were added. Copies of this correspondance were sent to Chief Area Nursing Officers of the Health Boards involved.

20 of the 21 hospitals responded, 3 after a reminder. In addition, as a result of iniative by the C.A.N.O., two additional responses were obtained. One was from a mental deficiency unit within a psychiatric hospital; the other from a mental deficiency hospital not listed in the Hospital Year Book. The number of respondents therefore totalled 23. Of these, 14 hospitals provided evidence of current involvement of nurses in the application of behaviour modification techniques to patients. In each case the respondent indicated willingness to participate further in the study.

(ii) Stage Two: This concerned the study of the nature and extent of nurse involvement (and provisions for nurse training) in those 14 respondent hospitals as above.

This study was carried out by visiting each of the 14 hospitals involved. Arrangements for the visits were made with the nurse respondent from Stage One and, in each case, a request was made to include in the visit:- (a) a brief interview with the respondent; (b) a meeting with the psychologist or psychiatrist, if involved; and (c) for each ward with ongoing behaviour modification activities, an interview with the Charge Nurse; a visit to the ward; and informal discussion with nursing staff on duty. In some cases, on the basis of specific information known to the researcher or provided by the respondent, specific requests were made (for example, to attend a weekly review meeting or to meet particular individuals.)

No attempt was made to devise a standardised interview or observational schedule. This seemed inappropriate due to the wide variation in the nature and extent of nurse involvement as indicated in response to the Stage One questionnaire. In addition, it could not be anticipated how much time would be extended to the researcher in visits. In fact, the length of visits varied between hospitals from 2 hours to 12 hours. In most cases, a minimum of 2 hours was spent in relation to any single ward or behaviour modification activity. The visits to the 14 hospitals were made mainly during October 1974. Many of the hospitals are situated in rural districts, and some distant from the researcher's base (Edinburgh).

Although no standardised method of study was developed, the main research methods employed were observation and interview. In all visits, the following data were aimed to be collected:-

1. specification of the nature of nurses' involvement in behaviour modification activities:

2. specification of the nature of the activities concerned (length of operation; characteristics of patients involved; aims and targets; behaviour modification techniques employed; results:)

3. information on nursing staff (responsibilities; control over selection and involvement; nurse training):

4. opinions of nurses concerning behaviour modification in mental deficiency nursing.

Data collected were not ameniable to quantitative analysis and the results of the study are presented as a description of the behaviour modification activities observed during visits. The nature of nurses' involvement in these is described and discussed.

CHAPTER 15:

## The Survey Study - Results and Discussion

### 1. Results

Of the total of 23 hospitals involved in Stage 1 of the study, 14 provided evidence of nurse involvement in behaviour modification. Results comprise data gained from these 14 hospitals. This number includes the previously-mentioned unit for mental defectives within a psychiatric hospital. (This shall be treated as a hospital). The group of hospitals studied is widely distributed throughout Scotland, between them covering 10 Area Health Boards. The number of beds per hospital ranges from 20 to 1325. Eight of the hospitals care for both adults and children; four for adults only; and two for children only.

Stage 1 data (from the questionnaire) suggested a division of the group of 14 hospitals into two distinct categories. The first involves a minority group of 3hospitals; the second a majority group of 11. In the first group, behaviour modification is apparently seen as being a practice integral to nursing care; in the second as being a specific therapeutic technique selected for programmes of training. In the first, behaviour modification is applied to all patients and involves all nurses while, in the second, it is applied selectively to specific groups of patients or within specific areas of the hospital and involves specific groups of nurses.

While this distinction is clear in principle, there is obviously some overlapping in practice. This is more apparent in the overlapping into the second category by hospitals in the first. However, the appreciation of the distinction led to some difference in the way that Stage Two was carried out in that the first group of three hospitals

was investigated in a more general way, whereas the second group of 11 was investigated in relation to specific behaviour modification programmes. The findings of Stage Two are presented within these two categories, and this basic distinction will be discussed later in view of its implications for nursing practice and nurse training.

A Behaviour Modification Practice in 3 Hospitals

Within these three hospitals the number of beds per hospital ranges from 20 to 225, thus being smaller hospitals than many within the total group. One hospital cares for both adults and children; and two for children only.

Hospitals 1 and 2:

Two of the three hospitals have a close association with each other, and are therefore discussed together. The association arises from their close geographical proximity and their sharing of a single Senior Nursing Officer. Behaviour modification practice is very similarly carried out in each hospital, and three features of this practice are particularly interesting. Firstly, behaviour modification was introduced by and is maintained by the Senior Nursing Officer, a nurse with evident knowledge of, and enthusiasm for, behaviour modification within mental deficiency nursing. She expresses a definite view of the application of theories of learning to many various aspects of nursing practice and, in view of her administrative position, is able to co-ordinate and unify practice of this application at ward level throughout the two hospitals in close collaboration with the ward sisters and nursing staff. Secondly, the introduction of behaviour modification practice into these hospitals over the last couple of years is seen to be at least partially responsible for dramatic improvements in patients' abilities. In the 20 - bedded children's hospital the majority of patients, many of whom are low-grade mental defectives, are independent with respect to self-help skills and show a high degree of socialisation. All nursing care involves training towards maximum independence, and this begins irrespective of

age or level of functioning on admission. In the other hospital, where the majority of patients are adult, similar emphasis is laid on training towards independence. A recent development is a 12 - bedroom 'flat' within the hospital in which training by behaviour modification towards totally independent living is carried out. Although most of the 12 female patients are high-grade, most have been in the hospital for many years. Amongst them they can now manage to cook, carry out all domestic chores, and look after themselves and their individual rooms with minimal help.

A third feature of these two hospitals is their very close, and active associations with their respective local cummunities. Many patients attend local churches, go shopping, and attend local social functions. Parents of patients and members of the communities are closely involved in activities of the hospitals, and behaviour modification practice is clearly seen as being closely related to social training and rehabilitation. There was evidence from discussion with nursing staff within the hospitals that behaviour modification is felt to be an appropriate approach, and, within this overall practice, there is now developing a series of specific programmes for individual patients, and an interest in patient assessment and evaluation of nursing care.

Hospital 3:

This hospital is known to have used behaviour modification techniques to a great extent when this approach was relatively new to mental deficiency in this country, following a visit to Parson's State Hospital (U.S.A.) by one of the senior nurses. Various behaviour modification programmes and token economy systems have operated within the hospital, these being largely initiated and operated by nursing staff. Behaviour modification was seen as being a most important and successful approach within nursing care.

Recently, in preference to behaviour modification per se., the principle of 'normalisation' has been adopted as the ideological framework for nursing practice throughout the hospital. It is generally felt that certain behaviour modification techniques, (for example the use of tokens in a token economy system), are

inappropriate within training and education aimed to equip the mentally deficient patient for 'normal' interaction and where relevant, ultimate independent living within the community. The principle of 'normalisation', now adopted throughout the hospital, does however have many similarities with behaviour modification in practice, and does not preclude the use of behaviour modification techniques. Where these techniques are used, the emphasis is very firmly on natural contingencies and natural reinforcers; and it is felt that patients have benefitted by the elimination of artificially-created training situations in their ability to generalise learned behaviour and to relate more naturally to nurses and other individuals.

The effectiveness of behaviour modification techniques is still recognised, and specific programmes operate for individual patients who appear to require a structured environment and stimulus control. These programmes are being increasingly developed by psychologists, with nurses involved to a lesser extent and with a more structured and direct therapeutic role than previously. Both in relation to these programmes and to behavioural aspects of the normalisation approach, an extensive programme of nurse training is being developed with psychologists taking an active part in teaching and in the development of teaching materials.

These three hospitals therefore illustrate the application of behaviour modification as being integral to nursing care and having developed as a widespread and purposeful approach. Both the first two hospitals together, and the third separately, owe this development to one individual nurse in particular. There is great similarity in the objectives of nursing care set by these individuals and adopted by the nurses as a group. In each of the hospitals, behaviour modification is seen as being effective and useful and, in the third, some selectivity has evolved in the evolution of the 'normalisation' principle. All three hospitals have a particularly close association with local communities and an evidently strong commitment to independence of individual patients and to developing the potential of each patient.

B. Behaviour Modification Programmes in 11 Hospitals:

11 Hospitals provided information in Stage One by relating the involvement of nurses in behaviour modification to specific programmes involving specific groups of patients and nurses.

Within these hospitals the number of beds per hospital ranges from 26 to 1325. Seven of the hospitals care for both adults and children; and four for adults only.

A total of 29 separate behaviour modification programmes are currently operating within this group of hospitals, the number in any one hospital ranging from one to six. The programmes can be grouped to include (a) 8 token economy systems; (b) 13 behaviour modification programmes; (c) 5 behaviour modification programmes for individual patients; (d) 2 points systems; and (e) 1 other. The rationale for this grouping is indicated prior to a description and summary of the main features of the programmes within these groups. There is no particular order of presentation within the groups. The classification of the 29 programmes as 'behaviour modification' will be later discussed and the findings are currently presented on the basis of their classification as such by the respondents in Stage One.

(a) Token Economy Systems

Eight behaviour modification programmes are grouped here as being token economy systems because of their use of tokens as conditioned reinforcers. Two token economy systems operate in each of three hospitals, the remaining two in two other hospitals. Each of the systems involves a group of patients.

Token economy system 1:

This system has been operating for three months and involves a group of 14 medium-to high-grade boys between the ages of 7 and 15. The general aims of the system are to maintain

basic self-help skills; to teach self-help and social skills; and to create an environment in which social and moral norms are introduced. Specific target behaviours are set for individual patients and tokens earned are exchanged for privileges or cash. Evaluation of the system is being undertaken, and various developments are planned to be introduced once it is felt that nurses and patients are competent within its present form. Progress by patients is evident to date and nurses feel that the system has improved their ability to plan care and to behave consistently towards individual patients.

Token economy system 2:

Four low-grade adult males between the ages of 22 and 42 have been involved for about six months in this token economy system which aims to raise their level of self-care within specified target behaviours. Programmes of training are carried out by one therapist (not a nurse) in a room off the ward during several hours each day. The system was introduced and developed by a consultant psychiatrist. Results show that all patients have to date achieved a significant increase in skills acquired, that the contingency of token presentation was demonstrated with a rise in personal achievement when tokens were presented, and a decrease when they were withdrawn; and that a reciprocal relationship arose between ward behaviour and token achievement in that presentation of tokens decreased ward misbehaviour to a minimum level. The system continues at present, being further developed on the basis of results gained to date.

Token economy system 3:

This is a ward-wide token economy system involving 28 medium- to low-grade children of both sexes and between the ages of 6 and 18. It has been developing over the past five years. Nurses were responsible for its initiation and, indeed, have been largely responsible for its development to the present highly complex system. All aspects of behaviour are considered to be relevant for modification, the aims of the system being to maintain and improve self-help skills, promote socialisation, improve communication skills, and to promote learning of occupational

and educational skills. In addition, the system is concerned to eliminate inappropriate behaviours, both those which are characteristic of behaviour problems in mental defectives and those of adolescence in general. The complexity of the system and the lack of recorded data make it difficult to determine precisely the achievements of the patients, but most are competent in the area of self-help skills, are able to cope with various activities outwith the hospital, attend school daily, and participate in the running of the ward. These improvements are reflected in repeated assessments on the Progress Assessment Charts which were carried out earlier in the development of the system, and an assessment method more relevant to the present situation is being developed. At present a major review and appraisal of the token economy system is going on. Current concerns related to this include the design of more effective and efficient methods of token presentation and exchange; selection and control of nursing staff; selection of patients for admission to the ward; involvement of parents and hospital staff who are in contact with the patients; and an involvement of patients in the management of the system. A nurse training programme is being developed and the possibility that this system might be used to train post-registration nurses in behaviour therapy is being considered.

Token economy system 4:

Presently under review after two years of operation, this system operates on a ward-wide basis for 15 male patients between the ages of 18 and 57. The patients are low- or medium-grade, many display severe behavioural problems and deficits, and were admitted to this particular ward because of its designation as a 'locked security ward.' The token system involves a 'basic daily allowance' of tokens from which deductions can be made for inappropriate behaviour, and earning of additional 'bonus' tokens contingent upon appropriate behaviour within a set of specified behaviours related to self-help skills and work performance. During the early period of the system many patients showed great improvements but, in the present situation, there is evidence that the system, while maintaining an achieved level of functioning, is not resulting in any further progress. 11 patients

regularly earn the maximum number of tokens while the remaining four rarely earn any bonus tokens and frequently lose some tokens within the basic allowance. As direct exchange of tokens for money is the method used, this means that some patients are penalised inappropriately and some of the patients are unable to appreciate the value of money. These problems suggest the need to review the targets, to concentrate on individual patients rather than on a group, and to consider alternative methods of token exchange. The system is at present operated by a charge nurse who is new to the ward, and there are current staff shortages.

Token economy system 5:

This system has been recently commenced with a group of 12 male patients between the ages of 18 and 50 who are medium - or low-grade. All of these patients previously were involved in a long-running token economy system which was set up by a charge nurse five years ago, and which was discontinued when he left the ward. Present shortages of staff prevent any complex system and, at present, the aim is to maintain a number of specified self-help and social skills previously learned. Tokens are contingent upon this regular maintainance and are exchanged for privileges, with deduction from tokens earned for misbehaviour. The system was developed by the Nursing Officer, (previously the charge nurse), and he supports the nursing staff of the ward it its operation.

Token economy system 6:

25 females high-grade patients between the ages of 19 and about 50 are involved in a ward-wide system which has been running for about eighteen months. The target behaviours are cleaning teeth, doing hair, and dressing and tidying own locker each day. Deductions may be made for those behaviours specified as misconduct from the daily earned tokens. Tokens are exchanged directly for goods from the ward shop (developed as being important to the system) or for privileges, these being selected as being powerfully reinforcing within a hospital ward. They include morning tea in bed, a long lie, and other similar

'treats'. Current problems include the low exchange rate of tokens for money ( inview of limited monies available for patients) and recent inflation which has affected the ward shop. In addition, the need to set new target behaviours is recognised as all patients earn their maximum quota. Therefore, further progress is not taking place. The system is run by ward sister and nursing staff, with some advice from the Nursing Officer who has considerable experience of token economy.

Token economy system 7:

This system was started about five years ago by a visiting American psychologist and continues to operate on a ward-wide basis for 26 patients of both sexes, between the ages of 16 and 72, and who are medium- to high-grade. 17 of the group are currently involved in the present phase of the system, each having an individual set of target behaviours and token contingencies and exchange. Over the past years most patients have made considerable progress in the areas of self-help, social and occupational skills. The system appears to be very much a part of the culture of the ward, to both patients and staff. However, the ideology of token economy as a system of management and living is currently under question. This seems to be related to the situation of this unit within a psychiatric hospital which is innured with a psycho-analytic approach. In addition, while the system continues, there is review of methods of recording and evaluation. Some attempt is felt to be required to rationalise the individual programmes to result in more efficient and consistent management of the system as a whole.

Token economy system 8:

A behavioural approach is currently developing on a ward-wide basis within a ward of 30 male patients. The group includes patients between the ages of 24 and 68, about half of whom are medium-or high-grade; and the other half include low-grade patients and 5 patients who are diagnosed as psychopaths. The ward, which has long been the security ward, and contains 12 patients who are certified under the Mental Health Act, remains locked and the nursing staff have been unable to introduce any element of therapeutic care into a situation which has required a custodial approach.

Recently, the charge nurse has become increasingly interested in behaviour modification techniques and a clinical psychologist is, with him, investigating the possibility of setting up a token economy system within the ward. The objectives of such a system are defined as reducing behavioural problems of aggression and sexual deviance; providing stimulation for the patients; promoting learning of self-help and social skills; and eliminating the current emphasis on custody and punishment. In order to establish specific target behaviours for individual patients, behaviour profiles are being established for each patient. This baseline assessment is being carried out by the nursing staff on a time-sampling basis and some nurse training is being introduced in preparation of the introduction of the token economy.

Summary of token economy systems described above:-

(i) Length of operation: Within the eight systems, there are two which have been operating for as long as five years (TEs 3 and 7), one (TE 3) which has been sustained through the continuity of the same charge nurse, and the other (TE 7) which has survived despite numerous staff changes and the retiral of the initiator after the first two years. Another two systems (TE s 4 and 6) are approximately two years old and both currently requiring review with respect to target behaviours which appear to be no longer relevant and to methods of token exchange. The remaining four systems (TEs 1, 2, 5 and 8) are all relatively recent.

(ii) Patients: Five of the systems are ward-wide in that all patients are involved (TEs 3, 4, 6, 7 and 8). The remaining three (TEs 1, 2 and 5) operate in relation to a selected group of patients, selection being related to a specified level of functioning in each case; and, additionally in two (TEs 1 and 5), to the ability of the patients to appreciate tokens and token values.

The size of patient groups varies from 4 to 30. Five systems (TEs 3, 4, 7 and 8) involve male patients only; two (TEs 3 and 7) involve patients of both sexes; and the remaining one (TE 6)

involves female patients only. A rough classification of patients by degree of deficiency indicates that one system (TE 6) involves high-grade patients only; three systems (TEs 1,3 and 5) involve patients who are either medium- or low-grade; one (TE 2) involves low-grade patients only; and the remaining system (TE 8) involves patients of all three grades (as well as a group of psychopaths).

(iii) Aims and Target Behaviours: Five systems (TEs 1,2,3,5 and 8) have explicit general aims or objectives relating to the operation of the system. The remaining three systems do not appear to have explicit aims. However, all systems provide some degree of specification of the target behaviours upon which presentation of tokens is contingent. In two systems (TE s 1 and 7) very specific target behaviours are set for each individual patient; another system (TE 3) has some current targets set for some patients; and another (TE 8) intends to adopt the degree of specifity of the first group mentioned. Four systems (TEs 2, 4, 5 and 6) include one set of targets for the group of patients as a whole. This seems to be satisfactory in two cases (TEs 2 and 5) in view of the similar level of ability amongst the patients in the group, but less satisfactory in the others (TEs 4 and 6), as has been indicated. Targets relating to self-help skills are those most frequently included in the systems and, in the two systems (TEs 3 and 7) in which they are not of great importance, this is due to previous achievements by patients earlier in the operation of those systems. Two systems (TEs 1 and 3) include the greatest range and number of targets, the latter of these being perhaps the most complex of all the systems. One system (TE 8) is primarily concerned with targets relating to behaviour problems and intends, conversely to most systems, to concentrate on self-help skills once initial targets have been achieved.

(iv) Behaviour modification techniques: The central technique to all of the token economy systems is positive reinforcement, using tokens as conditioned reinforcers. All systems have a clear (or at least fairly clear) method of token presentation, and of storing and displaying tokens earned. Each system has a specified rate of token exchange and in five cases (TEs 1,3,4,5, and 6) there is opportunity for deduction of tokens (or time-out from token earning) when inappropriate behaviour occurs. A variety of reinforcers for which tokens can be exchanged is available in each system. Material objects and food products are the most common. Two systems include the facility of a 'ward shop' within the ward, specifically for the purpose of token exchange. (TEs 3 and 6)

(v) Nursing Staff: Nurses were responsible for the initiation of six of the systems; a psychiatrist for one (TE 2); and a psychologist for the remaining one (TE 7). The last mentioned has, however, been controlled by the nursing staff since the initiator left the hospital several years ago. All of the systems are run by nurses, except one (TE 2) which is operated by a 'therapist' (who is not a nurse) and supervised by the initiator. This system is also unique in that it is carried on outwith the ward situation and during the daytime only. Three systems (TEs 4,6 and 7) appear to be without involvement to any degree of either a psychiatrist or a psychologist.

Thus, nurses can be seen to be greatly involved in seven of the eight token economy systems. This involvement includes responsibility for the day-to-day operations; for the overall design; for the co-orindation of personnel involved; for presentation and exchange of tokens; and for recording and evaluation methods.

In common with the general picture in mental deficiency, most of

the systems suffer to some extent from shortage of nursing staff. This is particularly chronic in one system (TE 5), and less so in two (TEs 3 and 7). One system involves the maintenance of a minimum staffing level (TE 1), although it is as yet unable to begin to select and control nursing staff as is desired. Three systems (TEs 4, 5 and 6) have no minimum staffing level and do not attempt to select or control staff. One system has some degree of maintenance of these factors by virtue of its situation as the only mental deficiency ward within a psychiatric hospital (TE 7). One system (TE 3), has gradually built up a permanent core of nursing staff within the ward, now operates a probationary period for new staff, and has some degree of selection of staff as well as control over their duties in relieving staff shortages in other wards. This system is currently extending these aspects of the management of the environment in which the token economy operates. The experiences of the longievity of this system have confirmed for the nurses that such controls are vital to the success of a token economy system.

(vi) Nurse Training: None of the systems has a highly-developed or consistent programme of training for nurses who work within them. In fact, three systems (TEs 4, 5 and 6) appear to have no training provision whatsoever. Two of these rely on guidance from Nursing Officers who have been involved to a large extent in the development of the systems, but the other at present has no nurse who is able to train other nurses. One system (TE 1) benefits from the previous behaviour modification experience of one nurse and an attempt is being made by him to develop an in-service approach to nurse training. Two systems (TEs 3 and 7) benefit from their long duration of operation. In the former case, the Charge Nurse who was involved in the initiation of the system is, along with the Nursing Officer, developing a very detailed and ambitious

programme of induction training and maintenance training for nursing staff (and other personnel) who operate within the system.

(vii) Evaluation: All of the eight systems have some method of recording information about the functioning of the system through which evaluation of its effectiveness can be made. These features are particularly well developed within two systems (TE s 1 and 2) and particularly poorly carried out in two (TE s 4 and 6).

(viii) Results: Due to the poor evaluation of the two systems specified above, the precise nature of their achievements is difficult to assess. The first (TE 4) has evidence of considerable improvement in specific aspects of behaviour during its first year of operation, but it is doubtful if any progress has been made during its second year. The second (TE 6) has never kept details of patients' response to the token system. All patients are able to regularly perform the behaviours which constitute the current targets, and so results remain unclear. Five of the systems (TE s 4, 5, 6, 7 and 8) are in too-early a stage of development for results to be available and meaningful, although in each case the nursing staff were confident that some progress has been achieved. Although also relatively newly developed, one system (TE 1) has encouraging results available showing that patients are acquiring target behaviours. System 2 (TE 2) has involved detailed analysis of the response of each of the four patients to the programme of training. The results are summarised within the description of this system provided earlier. In talking to the nurses who are, and have been, involved in TE system 3, it is obvious that patients have progressed to a great extent in all areas of functioning. However, due to the complexity of this system, methods of recording progress have been inconsistent and incomplete. Empirical evidence of progress made is therefore not available. However, it is apparent that the patients

are functioning at a high level of social competence; most are independent in relation to self-help skills; and the majority are competent in functioning appropriately within a variety of situations outwith the hospital.

(ix) Publication: There has been no publication relating to any of the systems currently operating by personnel involved. The system from which TE 5 has been developed is described by Cummings (1972). TEs 5 and 7 are referred to in the review of Turton and Gathercole (1972).

(b) Behaviour Modification Programmes

13 of the total of 29 separate behaviour modification programmes are grouped here under this general heading. Each involves the application of behaviour modification techniques, centred upon the use of positive reinforcement (other than tokens) to groups of patients (that is, more than one). Three of these programmes operate within one hospital; two within each of four hospitals; and one within each of two hospitals.

Behaviour Modification Programme 1: This programme, described by the hospital as 'a group therapy training programme' has recently re-started after operating for three months about a year ago, (then temporarily discontinued when the Charge Nurse was promoted). The ward-wide programme operates for 26 low-grade mental defectives who are between the ages of 6 and 14, and of both sexes. The aim of training is to improve the self-help and social skills of the patients and, since the initiation of the programme, improvements in these areas have been noticed. A reduction in incontinence, has been achieved in particular. Continuity of nurse-patient relationships is encouraged by the grouping of patients according to similarity of ability, although no selection or control over nursing staff has been possible. Behaviour modification techniques are not applied stringently, but some attempt is being made to maintain consistent and appropriate reinforcement.

There is no staff training; targets are not set specifically for individual patients; and there is no method of recording or evaluation.

Behaviour Modification Programme 2: A nurse, experienced in mental deficiency and interested in behaviour modification as a result of attending a national workshop, has recently introduced a behaviour modification programme into the industrial therapy unit of which he is Nursing Officer. 12 male patients, aged between 16 and 50, and of medium- or high-grade, are divided into two groups for their work within the Unit. Each group spends two weeks out of every four in the concrete department, the area in which the programme has been introduced. Previously, payment was not related to work performance, being paid at a fixed flat rate. The programme aims to provide a realistic industrial system with earnings related to performance. It is hoped that this will prepare patients for their eventual employment within the local community. This programme is essentially a conventional 'bonus scheme' but appears to secure description as a behaviour modification programme on account of several features. These include specification of target behaviours upon which the monetary reinforcement is contingent; training the men in the skills specified within the targets by the use of techniques of shaping and modelling, involving immediate (social) reinforcements; and cumulative recording of the patients' behaviour while working in the concrete department. Results indicate that the work performance of the patients has improved steadily. There is also a reported improvement in other aspects of behaviour, both within the Unit and in the ward.

Behaviour Modification Programme 3: For about a year, nurses working in a ward for 18 low-grade patients, males and females, between the ages of 9 and 21 have been developing patients' self-help and social skills through the application of behaviour modification techniques. The emphasis has been on toilet training and some attempt has been made by the Charge Nurse to become conversant with recent literature on this subject. However, in general, the aims of this programme are ill-defined. No specification is available of the techniques used, of the targets set, or of the

progress made by the patients. There is no provision for nurse training and the general opinion of the nurses is that the programme has not been successful.

Behaviour Modification Programme 4: Four low-grade male patients (ages 16 - 40), all with severe behaviour problems (and one of whom is immobile,) have been involved in a behaviour modification programme over a six-week period. This developed by the Charge Nurse and psychologist, generally aims to control inappropriate behaviour and to establish self-help and social skills. The programme operates for 8 hours a day in a training room adjacent to the ward. The programme of training includes sensory training, occupational and physiotherapy and skill-learning. It involves the application of behaviour modification techniques, primarily reinforcement therapy. Specific target behaviours have been set for each patient and it is apparent that some improvements have been achieved to date.

Behaviour Modification Programme 5: Recently a programme of occupation training, involving appropriate positive reinforcement, has been set up for three low-grade male patients (ages 19 - 45). The aim of training is to teach them specific work skills in order that they will be suitable to take part in the activities of the industrial therapy unit. The training is carried out by nursing staff within the ward at certain periods during each day. The programme is being supervised by a psychologist.

Behaviour Modification Programme 6: This programme was set up as a research project, primarily to evaluate a treatment approach alternative to traditional supportive or custodial measures. The selected approach is broadly based on theories of learning, and involves an intensive teaching programme within an environment which aims to maintain stimulus control conditions. Four male low-grade patients with severe behaviour problems, (2 adolescents and 2 middle-aged), were selected to take part in the experimental study. Over a period of three months they underwent a series of training programmes relating both

to the establishment of self-help and social skills and to the extinction of maladaptive behaviours. The programme was designed and implemented by a Staff Nurse and a group of Enrolled Nurses were selected to take part in the controlled study. Comparisons of pre- and post-experimental data indicate that considerable success was achieved in relation to the aims of training. Subsequently a programme of 're-integration' was introduced during which the patients returned to their ward environments. Progress made has been maintained, six months after the end of the programme.

Behaviour Modification Programme 7: 14 low-grade male patients (ages from 26 - 42 years), many with behavioural problems, are involved in a behaviour modification programme which aims to develop learning of self-help skills and social and occupational skills. The programme, which was started by a psychiatrist, is carried out within the ward situation, under his supervision. It has been operating now for over a year. It involves various groups and individuals in specific training programmes and a great deal of progress has been made by the patients who, formerly, were almost totally dependent on the nursing staff. An interesting feature of this programme is the related training programme for the group of four nurses involved and the diversional therapist who contributes largely to the occupational training aspect. The nurse training programme is run by the psychiatrist and has been developed with particular emphasis on the skills of assessment, task or behaviour analysis, and evaluation.

Behaviour Modification Programme 8: Within a ward of 48 male patients, aged between 17 and 70, and of whom more than half are low-grade, a behaviour modification programme was started five months ago. This involves a single target behaviour, that of independent shaving. The programme was developed by the Charge Nurse and psychologist. The aim is both to reduce the time-consuming task of the nurses in shaving

48 patients each morning, and to increase the independence of the patients within a specified area. 14 patients now shave themselves daily, requiring only minimal supervision or prompting. Training is provided for each individual patient each morning, over a period of about 3 weeks. The techniques being used include shaping, prompting and modelling within a set of responses, identified from task analysis of the behaviour. Social approval is the reinforcer used and the training is undertaken by nurses or the psychologist.

Behaviour Modification Programme 9: A programme of self-feeding training has been ongoing in a children's ward over the past two years. It currently involves a group of six low-grade children of both sexes, between the ages of 7 and 19. The programme, which was initially designed by the psychologist, is implemented by the Ward Sister and Nursing Staff. The technique of backward chaining through a sequence of seven stages is employed. Training is provided during two meals in each day when adequate staff are available. Records of the patients' performance at each meal are kept and, of the total of eight children who have been a part of the training group, two now feed themselves without help; two can feed themselves independently (but their performance is inconsistent, apparently on account of frequent episodes of ill-health); and the remaining four patients are making progress to date.

Behaviour Modification Programme 10: In a ward of 22 low-grade mentally deficient children a programme of toilet training by behaviour modification techniques is currently being planned. The ages of the patients range from 7 to 19, and there are boys and girls in the ward. Attempts have been made by nursing staff over the past few years to toilet train the patients, the majority of whom have not responded to training and remain doubly incontinent. Previous methods of training were based on a routine of regular toileting with some use of positive reinforcement techniques. The lack of success is felt to be due to the problems encountered due to the low level of functioning and physical handicaps of many of the children.

Recurrent shortages of nursing staff necessitated that the routine be suspended. The present programme aims to include both a group training programme, (involving the stringent application of behaviour modification technqiues) as well as programmes for selected individuals, these being based on the method of rapid toilet training described by Azrin and Foxx (1971). Some selection of, and control over, nursing staff is being planned as well as preliminary training for the nursing staff. The advice of a psychologist is available to the nursing staff.

Behaviour Modification Programme11: A small purpose-designed unit, separate from the wards, accomodates seven young medium- and low-grade patients throughout the weekdays for training. The patients' (ages range from 15 months to 9 years) include boys and girls. The general aim of training is to develop self-help and social skills appropriate to normal children of comparable chronological age and specific training relates to toileting, feeding, dressing and washing. These programmes use reinforcement therapy and techniques which are similar to those of shaping, modelling and prompting. The unit has been operating for about 18 months and marked progress has been achieved in this time. A permanent staff of three nurses is responsible for the unit and the importance of consistent and close relationships with the children is seen as being central to their training.

Behaviour Modification Programme 12: One Ward Sister (who was involved in the experimental toilet training programme described in the previous part of this thesis) has been developing a behaviour modification feeding programme over the last six months. She has been working in conjunction with a Nursing Officer (who has specific responsibilities for behaviour modification projects) and a psychologist. The target behaviour of the programme is specified as 'eating a complete meal with a spoon and exhibiting no inappropriate behaviours during a meal'. Task analysis of feeding

behaviour provided the basis of a shaping sequence involving eight steps; and backward chaining is employed. Six low-grade patients, three males and three females, are involved at present. Their ages range from 6 to 22. One patient has reached the target behaviour; one is near to reaching it; and the other four are making steady progress. Another similar group of patients are being trained concurrently in a feeding programme which is not explicitly programmed and does not apply behaviour modification techniques as such. It is interesting that, while some progress has been made, this does not appear to equal that of the 'behaviour modification group.' All nurses are involved in the programme and some nurse training is carried out.

Behaviour Modification Programme 13: A maintainence training programme for those patients involved in the experimental toilet training study is operating. About half of the population involved in the two experiments continue to be trained, the size of the group steadily diminishing as the target behaviour is reached. In addition, small numbers of patients in that ward who were not trained in the study and who remain incontinent are being toilet trained according to the method described earlier. All nurses are involved in the programme and some staff training is provided by the Ward Sister. The Nursing Officer continues to carry out evaluation of the results of the initial study, this showing that to a great extent progress achieved continues to be maintained.

Summary of the Behaviour Modification Programmes described above:-

(i) Length of operation: This varies between a few weeks (for those programmes which have recently commenced) to a period of about two years. The majority of the programmes (Ps. 1,2,4,5,6,7,8,10 and 12) have operated for less than six months. Two programmes have operated for between six and twelve months (Ps. 3 and 13); the remaining two (Ps.9 and 11) for between one and two years. The relatively short

length of operation is interesting and it suggests that behaviour modification is a relatively recent innovation into the wards which have been described. However, it should be noted that the date of initiation refers to that relating to the current programme and, in some cases (for example, P. 13) this is subsequent to a previous programme.

(ii) Patients: A total of about 220 patients are involved in the 13 behaviour modification programmes described, the size of groups ranging from 3 to 49. Within nine programmes (Ps. 1,3,4,5,6,7,9 10 and 12) patients are classified as being low-grade mental defectives; within two (Ps 11 and 13) as being low-grade or medium-grade; and within two (Ps 2 and 8) as including some patients in each of the three grades.

Seven programmes (Ps 1,3,9,10,11,12 and 13) include patients of both sexes while the remaining six programmes (Ps 2,4,5,6,7 and 8) involve male patients only. None of the programmes therefore is for female patients only; and no female patient over the age of 22 years is involved in any programme (as those for patients of both sexes all operate in juvenile wards). Within these programmes for children, the ages range from 15 months to 22 years; while the age range within the remaining six programmes (i.e. those in adult wards) include patients with ages ranging from 16 to 70 years.

Six programmes (Ps 1,3,7,8,9 and 13) are ward-wide programmes; that is, they involve all of the patients in one ward. Three other programmes (Ps. 5, 9 and 12) also operate in the ward situation, but these involve selected patient groups only. Four programmes operate outwith the ward situation (Ps. 2,4,6 and 11). Three of these operate in off-ward units and one (P.2) is an industrial therapy unit. All involve a selected group of patients.

(iii) Aims and Target Behaviours: Most of the 13 Programmes have fairly explicit general aims, the degree of explicitness being reflected in the target behaviours of the programme. Three programmes (Ps. 3, 4 and 5), those with perhaps the widest range of targets and a correspondingly low degree of their specification, have rather poorly-defined aims. One of these (P. 3) appears to aim for little more than to provide a 'therapeutic approach' to the management of patients. Five programmes (Ps. 8,9,10,12 and 13), on the other hand, have very specific aims related to specific, single target behaviours. Of these, two (Ps. 9 and 12) are concerned with self-feeding; two with independent toileting (Ps. 10 and 13); and one (P. 8) with independent shaving. Specific aims and specific targets are included in the programme concerned with the work performance of patients in the industrial therapy unit (P. 2). The remaining four programmes (Ps. 1,6,7 and 11) share the broad general aim of 'improving self-help and social skills.' In this group two programmes clearly specify the target behaviours upon which training concentrates (Ps. 6 and 7). One of these two (P. 6) displays a unique specification of both aims and targets; this feature is related to the fact that the programme is a research project.

(iv) Behaviour Modification Techniques: Illustrated within the programmes described are various degrees of stringency, both in the use of reinforcement and of behaviour modification techniques. This variation can be to some extent be related to the degree of specification of the aims and targets of the programme.

A stringent approach to the use of reinforcement is adopted within eight programmes (Ps. 2,6,7,8,9,10,12 and 13). This means that, in these programmes, reinforcers are isolated for individual

patients and that defined contingencies of reinforcement are recognised. In addition, reinforcement presentation aims to be imediate.

In the remaining five programmes (Ps. 1,3,4,5 and 11) a less stringent approach is adopted. In these, all patients are reinforced with the same kinds of reinforcers (most commonly social praise); and contingencies of reinforcement are not usually identified. In three of these programmes (Ps 1, 3 and 5), the method of reinforcement appears to be vague and inconsistent.

A conventional application of behaviour modification techniques is followed in five programmes (Ps. 6,8,9,10 and 12). This is particularly true in those which involve a single target behaviour, and when training is carried out within a defined and limited period of the day. The techniques of shaping and backward chaining are most commonly used within these programmes. One (P. 6), in accordance with the multiple targets, also employs the techniques of modelling and extinction. In five programmes (Ps. 2,4,7,11 and 13) the techniques and their application are defined, but less stringently. This may be related to the multiple targets involved, and to the longer periods of training with groups of patients. In the other three programmes (Ps. 1,3 and 5) techniques are not defined and the methods of training used, at best, only emulate conventional behaviour modification techniques.

(v) Nursing Staff: Nursing Staff are closely involved in each of the 13 behaviour modification programmes, in most cases assuming overall responsibility for its implementation. Eight programmes (Ps1, 2,3,6,9,10,11 and 13) were initiated by nurses; four by nurses in collaboration with psychologists (Ps 4, 5, 8 and 12); and one by a psychiatrist (P. 7), although nurses were consulted in the planning stages.

Some degree of maintaining stability over the nursing staff operates in the majority of programmes, albeit to a small degree in many cases. One programme (P. 2) involves only one nurse and so consistency is obviously maintained in this. Two programmes feature a specially selected group of nurses (Ps. 6 and 11) which is kept stable. In four other programmes (Ps. 4, 7, 12 and 13), either a minimum nurse staffing level is aimed for, or else the maintenance of a core of permanent staff is achieved. Some degree of selection and control is aimed for in one other (P. 10), although staffing problems of the hospital limit the desired degree of this. Another programme (P. 1), while unable to select or control nursing staff, uses allocation of nurses to particular groups of patients in order to approach some degree of consistency. In the remaining four programmes (3, 5, 8 and 9), staff shortages do not permit either selection or control.

(vi) Nurse Training: Programmes of nurse training to prepare for their involvement in applying behaviour modification techniques are integrated into five programmes (Ps. 6, 7, 10, 12, and 13). One of these (P. 7) includes nurse training on a regular basis, and involves aspects of behaviour modification wider than those related to the patient training programme. Two programmes (Ps. 2 and 11) at present do not have nurse training because it is not required. Three programmes (Ps. 4, 5 and 8) provide training for nurses which is related directly to their present involvement in the programme. In each case this is provided by the psychologist who supervises the behaviour modification activities. Three programmes appear to be completely without the provision of training for nurses (Ps. 1, 3 and 9), although training appears to be required.

(vii) Evaluation: A fairly thorough method of evaluation is built into most of the 13 behaviour modification programmes (Ps. 2,6,7,8,9,10,12 and 13). In these, records are kept and the progress of individual patients is able to be assessed on the basis of empirical data. This aspect of the programme is seen to be of particular importance in four programmes (Ps. 6, 10,12 and 13). Two of these (Ps. 6 and 13) owe this to their research component. Some evaluative methods are a part of three programmes (Ps. 4,5, and 11). No records or evaluation are maintained in two programmes (Ps. 1 and 3).

(viii) Results: Evidence that patients have made progress in relation to the aims and targets of the programmes is available from nine programmes (Ps. 2,4,6,7,8,9,11,12, and 13); very precise results can be obtained in seven of these (Ps. 2,6,7,8,9,12 and 13). Results are not yet available from two programmes (Ps. 5 and 6). Two programmes are unable to indicate that patients have progressed to any great extent (Ps. 1 and 3). It seems doubtful if these programmes have benefited the patients significantly.

(ix) Publication: Of the 13 programmes, details of one (P. 13) are available in the present thesis. Aspects of one other (P. 6) are described in the recent report of Barker (1975).

### (c) Individual Behaviour Modification Programmes

Five of the total of 29 separate behaviour modification programmes are grouped here as 'individual behaviour modification programmes'. Each of these five relates to a programme for one individual patient.

Individual Behaviour Modification Programme 1: This is a toilet training programme for a 20 year-old low-grade patient (male) who has failed to respond to a ward-wide habit training regime.

The programme is based on the rapid method developed by Azrin and Foxx (1971), although many modifications have been made in practice. A pants-alarm apparatus is used and fluid intake is increased. Over a period of six weeks the patient has made progress from being doubly incontinent, and unresponsive when toileted, to being continent throughout each day. He can indicate that he needs to be taken to the toilet and has on occasions gone himself. The programme was designed by the psychologist and is implemented by the nurses. It would appear that preparation for the nurses is rather inadequate and the patient's progress tends to regress from time to time when nurses on duty are unsure what to do.

Individual Behaviour Modification Programme 2: Following prolonged, unsuccessful attempts to eliminate a high-frequency and severe self-mutilation behaviour, behaviour therapy has been introduced. The patient is a low-grade, 8 - year old boy. The problem behaviour is described as self-hitting and, prior to this programme, the rate was as high as 2,000 hits per day. The behaviour therapy procedure has involved an aversive technique, transmission of the response via a radio device being followed by an electric shock. Early technical problems with the apparatus failed to sustain a consistently reduced response rate, but this is now maintained at around 20 hits per day. The programme has been closely supervised by a clinical psychologist and medical staff, and nursing staff have been involved with the treatment. One nurse in particular has been largely responsible for the child over the treatment period of about one year. The achieved reduction in self-hitting has now allowed various therapists to proceed with the patient's education. It would appear that the child has considerable potential. His diagnosis is given as 'brain damaged with autistic features'. It is thought that he may have greater potential than implied by his classification as low-grade.

Individual Behaviour Modification Programme 3: A programme was developed to extinguish behaviour problems in a 9 year-old high-grade boy who, in the ward, was extremely disruptive and aggressive. The programme was initiated by the nursing staff about a year ago and is described as a 'marking system'. This system has many features in common with a token economy system, involving the giving of marks for good behaviour and deduction of marks for inappropriate behaviour. The deducted marks are considered as penalty marks and, if these reach a specified number over a week, loss of privileges results. These include going home for visits, or visits to the ward by parents. This shows the co-operation of the parents in this programme. To specify what progress has been made appears difficult and, although the child continues to cause concern, certain aspects of behaviour do appear to have improved.

Behaviour Modification Programme 4: Over a period of six months, a behaviour modification programme has been developed by a psychiatrist for a 9-year-old boy. The child has now been diagnosed as suffering from infantile autism and has been admitted to hospital from home as a crisis intervention measure due to his parents finding him 'completely uncontrollable'. He has lived mostly at home, being periodically hospitalised for short-term management. He has been variously described in the past as being 'ineducable', 'untrainable', and 'uncontrollable'. At the time of his admission he was severely hyperkinetic, withdrawn, displaying a variety of autistic features, unable to sustain eye contact, incontinent, and unresponsive to human contact. The behaviour modification programme aims to control inappropriate behaviours and, if possible, to establish self-help and social skills in order that he can return home to his family. The programme comprises two main features. Firstly, a one-to-one nurse-patient relationship is maintained. One nurse, selected on the basis of his demonstrated ability to relate to the child in some way, 'specials' the patient throughout his duty periods. During this time attempts are made

continously to modify the child's behaviour. The second feature of the programme involves formal training by behaviour modification techniques. A series of defined training schedules are being worked through systematically. This training is being carried out in a special off-ward unit by the nurse and the psychiatrist. Recent developments have included the involvement of the parents in the formal training and occasional periods of generalisation training in the home, with the nurse and mother working together. To date, the child has made considerable progress. He can now feed himself, is usually continent, is less hyperactive and has acquired a variety of skills. He interacts with the nurse and now approaches other nurses and patients. These improvements have not yet been demonstrated to have generalised into the home and current training is concentrating on this aspect. It is now thought desirable to reduce the child's dependence and his attachment to the nurse, and he is being gradually exposed to increasing numbers of people.

Individual Behaviour Modification Programme 5: Various approaches have been made, unsuccessfully, to improve the general behaviour and work performance of a 19- year-old male patient within the situation of the workshop which he attends daily. He is a patient of medium-grade, although his level of functioning often appears to be below the level expected. It was thought that the continuing problem may be managed by the introduction of a structured and systematic approach, and so a token economy design was developed. This has been done by the occupational therapist in conjunction with a member of the nursing staff. The patient's work consists of removing labels from plastic textile cones. Baseline observations were taken to ascertain the level of activity at the job. The procedure of training involves reinforcement by tokens being made contingent upon increasing levels of work performance (determined by the number of cones managed per session). The tokens are exchanged weekly for pocket money. In addition, social approval is given for all appropriate behavious during work sessions; and reinforcement is withheld following

inappropriate behaviour. Results show considerable improvement in work behaviour and reports indicate that general behaviour has also shown improvement.

Summary of above individual behaviour modification programmes:-

By virtue of the above five programmes being specific to one patient and his individual problems comparisons between programmes are less relevant here. Some general points of summary may be made. The five programmes have been operating for various lengths of time, the shortest (IBMP 1) for six weeks and the longest (IBMP 3) for one year. All five patients are male. Two patients are considered to be low-grade (1 and 2); one medium-grade (5); and one high-grade (3). The remaining patient (4) is classified as autistic. The patients' ages range from 8 years to 20 years. It is interesting that three patients (2, 3 and 4) are close in age at around 8 and 9 years; and two others who are older (1 and 5) are also close in age. In each case the programme was introduced to deal with a very specific problem. Incontinence was the problem of patient 1; self-mutilation of patient 2; multiple behaviour problems were the presenting problem in patients 3 and 4; and poor work performance in that of patient 5. It is also interesting that, in each case, alternative methods of treatment had been unsuccessful in dealing with the particular problem and behaviour modification was considered only at that point to be appropriate. The design of each programme is again specific and the techniques vary from shaping and the use of an alarm apparatus (IBMP 1) to a token economy type of system (IBMP 3 and 5); from aversive therapy (IBMP 2) to a complex amalgamation of techniques (IBMP 4). However, the programmes also share some common features.

In each, training is individual, intensive, and reinforcement is

consistently and stringently used. One programme (2) uses punishment techniques. In each programme targets are set; these are adjusted according to progress; and the improvements can, in the main, be seen from empirical data. All programmes feature stringent evaluation techniques.

In three programmes (1, 2 and 3) nursing staff on the patient's ward are involved in the programme. In one of these (2) one nurse has had particular responsibility for the programme. A psychologist is involved in each of two programmes (1 and 2); and psychiatrists in two others (2 and 4). Only one (5) is without a high degree of involvement of nursing staff, this being controlled by the occupational therapist. Only one programme (3) is run by nurses alone. The involvement of parents in three of the programmes (3, 4 and 5) is an interesting feature. Training of nurses (and those others who participate in the programmes) is carried out by the instigators in each case. Case conferences, evaluation, discussion and instruction are carried on in an informal, but systematic way. Perhaps an exception to this is IBMP 3 which tends to depend on the nurses themselves becoming acquainted informally with the system.

### (d) Points Systems

Two of the 29 programmes are classified in this section, the term being somewhat self-explanatory in that these are systems involving the use of the award of points. The acceptance of this group as behaviour modification will be dealt with in the discussion.

Points System 1: In a ward for 26 male patients a points system has been in operation for about four years. The patients are aged between 16 and 50; and are considered to be high- or medium-grade mental defectives. The system was designed by the Charge Nurse and a psychiatrist. It aims, not to modify behaviour, but to maintain it at a level

achieved in the past. A list of behaviours which the patients are expected to maintain is specified (these include self-help and social skills) and points are deducted for failure to maintain these. A certain deduction of points leads to a fine being levied; there is no reward for keeping the total allocation of points. The system rarely appears to operate, but is kept in progress in case of need or regression.

Points System 2: For many years a points system has been operated by the nursing staff in a hospital for a variety of patients. Recently the psychologist has intervened with the aim of rationalising payment to patients for work and to include behavioural ratings as one aspect of the system. 90 patients between the ages of 17 and 70 are involved. These are of both sexes and all grades of deficiency. The work therapists provide details of the patient's work performance over a week and the nursing staff rate the patients' behaviour on a graded scale. Payment at the end of the week is allocated on the basis of this joint assessment. The patients are told how their pay has been determined. The reorganised system has not been in operation long enough to specify its achievements. Individual records show improvements in both the work performance and general behaviour of many of the patients, however.

(e) Other.

One additional behaviour modification activity does not appear to fit into any of the groups so far discussed, and is thus presented individually and without classification. This involves one ward housing 24 female patients between the ages of 18 and 60. All have a low level of functioning and are considered to be low-grade. The ward does not operate a ward-wide behaviour modification programme, but behavioural techniques have been used for various individual patients over a period of eighteen months or so. The Ward Sister, who has done this work, prefers not to term her methods as 'behaviour

modification', but it is apparent that a variety of identifiable behaviour modification techniques have been used. These techniques tend to be more like behaviour therapy than behaviour modification and repeated use of the technique of 'overcorrection' is apparent. Examples of treatments which have been extremely successful in bringing about a permanent change in behaviour include (i) the elimination of persistent screaming (time out and play-back of screams on tape being applied; (ii) the extinction of self-picking of a patient previously kept in a restrainer; and (iii) the extinction of the repeated responses of one patient to another while making jigsaws, which consisted of throwing the pieces over the floor. These examples indicate specific use of behaviour therapy and behaviour modification techniques, and other more general improvements in patients' self-help and social skills have been attributed to the Sister making a deliberate effort to manage the consequences of the behaviour of patients. This has tended to be the effort of this nurse on her own, and she has not particularly ventured to formulate a more systematic total approach involving the rest of the nursing staff.

## 2. Discussion

The involvement of nurses in the application of behaviour modification techniques to patients in mental deficiency hospitals in Scotland appears to be quite extensive, both in breadth and depth. At the time of survey, nurses were involved in this in over one-half of the hospitals in Scotland (14 out of 23). In three hospitals, the involvement is maximally extended by the adoption of a behavioural framework for nursing practice; and all nurses and patients are involved in behaviour modification activities. In 14 hospitals, the

involvement of nurses is specific to particular behaviour modification programmes operating. Their number ranges from one to five in any one hospital and, therefore, specific groups of nurses and selected groups of patients are involved in behaviour modification. A total of 29 programmes was identified within these 14 hospitals.

An indication of the extent of nurse involvement can be provided by calculating the percentage of the total patient population (in mental deficiency hospitals in Scotland) which is in receipt of behaviour modification training or treatment. The total number of patients involved in the behaviour modification activities surveyed ('practice' and 'programmes') is 888. This represents 12.20% of the total patient population (calculated on the basis of bed statistics provided in the Hospital Year Book, year ended 31st March, 1970, which shows the total number of beds in mental deficiency hospitals in Scotland to be 7273). This shows that the percentage of patients involved in behaviour modification is relatively small. Nurse involvement in behaviour modification is therefore a minority function of nurses in mental deficiency at the present time.

Nevertheless, the extent of nurse involvement identified in the survey was greater than expected on the basis of information obtained informally. Nurse involvement in the main part is confined to isolated activities within large hospitals. It would be of interest to ascertain whether or not the survey identified the full extent of nurse involvement in behaviour modification. For example, hospitals in Stage One which returned questionnaires without evidence of involvement could be sampled, and nursing practice observed to provide support or contradiction to this evidence.

The nature of nurse involvement in behaviour modification was found to be varied, comprising token economy systems, various behaviour

modification programmes, individual behavioural treatment programmes and points' systems. A majority of these various activities was initiated by nurses themselves; and almost all are dependent upon the day-to-day responsibility held by nursing staff for their implementation and continuation. About half of the activities do not have any involvement of professions other than nursing. In those which do, psychologists and psychiatrists are most commonly the professionals involved.

The distinction identified in Stage One of the survey between 'behaviour modification practice' and 'behaviour modification programmes' is interesting. In the first category, behaviour modification is seen as a practice integral to nursing care and a framework for nursing care. In the second category, behaviour modification is seen as a specific therapeutic approach, and an adjunct to other forms of nursing practice. These categories are not mutually exclusive. Three features apparent in the three hospitals in which behaviour modification practice prevailed do not appear to assume the same emphasis within the other 11 hospitals in which behaviour modification programmes were operating. The features are: (i) a high degree of commitment and involvement of nurse administrators; (ii) a resulting organisation, co-ordination and ordered progression of behaviour modification activities; (iii) a close association between the hospital and its local cummunity. These features may be directly related to the smaller size of the hospitals concerned and the finding of these may be idiosyncratic and irrelevant to the subject of nurse involvement in behaviour modification. Nevertheless, these features of philosophy and administration are felt to have been of great advantage to the effective and acceptable development of nurse involvement in behaviour modification in these specific settings. In these, nursing care has assumed the total behavioural approach to nursing practice, as described by Loomis and Horsley (1974)

and an explicit process of nursing has been developed within the operant conditioning model.

The distinction identified is felt to be relevant to a discussion of behaviour modification in mental deficiency nursing as it suggests two possible models for its development. A further distinction is offered on the basis of the survey study which is related to this. This distinction is between 'Behaviour Modification' and 'behaviour modification', the presence and absence of capital letters signifying the difference between 'proper' and 'improper' usage of the term. Gardner (1971) states:-

> "Behavior modification is a term that applies both to an orientation to clinical problems that is conceptually consistent with experimental psychology and to a number of different behavior change techniques that have the goal of changing human behavior in a beneficial manner."

Further, in relation to clinical application, Ullman and Krasner (1965) clarify that:-

> "the subject is exposed to an environment which is manipulated by the therapist to provide meaningful contingencies for the subject's differential responses to stimuli."
>
> "The basic criterion, however .... ", notes Gardner, "is that a functional relationship is demonstrated between observable behavioral changes and measurable environmental events ... "

Five conditions are suggested by the researcher as being essential in a clinical programme which merits description as 'Behaviour Modification'. These are:-

1. Conceptualisation consistent with the operant conditioning model;
2. Precise definition of the behaviour to be modified and explicit identification of targets (which have the aim of beneficial behavioural change);
3. Manipulation of environmental contingencies by appropriate and systematic reinforcement;
4. Evaluation of the manipulation by measurement of observable changes in strength or frequency of the target behaviour;
5. Demonstration of the functional relationship between the manipulation and the observed behaviour change.

It is therefore clear that many of the behaviour modification activities identified and investigated in the survey study do not meet these conditions. Thus, such activities are more accurately described as adaptations of Behaviour Modification in which behavioural principles and techniques are only loosely applied. The Individual Behaviour Modification Programmes and the single - target behaviour modification programmes are those which can be considered to exemplify 'proper' application of behaviour modification and merit description by the term 'Behaviour Modification'. (In distinguishing between behaviour modification and behaviour therapy in this research, some of these would be more correctly described as behaviour therapy, in fact). This terminological distinction may appear as pedantic and concerned with semantics, but does hold implications for models of development of behaviour modification in mental deficiency nursing and for aims of nurse training related to this.

Outwith this distinction, the various behaviour modification activities surveyed provide further addition to the accumulation of evidence which demonstrates the effectiveness of behaviour modification in mental deficiency to many types of behaviour deficits and problems in mental defectives of all ages and levels of disability. The variety of activities limits comparison and quantification, but a few points are notes here. The size of patient group varies from1 to 90; and ages within these groups from 15 months to 70 years. Patients of both sexes are involved in the activities, although a previous observation of literature concerning the lesser involvement of female patients is again evident. While 16 programmes concern male patients exclusively, only three programmes concern female patients thus; and no female patient over the age of 22 was involved in any of the 13 behaviour modification programmes surveyed. All grades of mental

defectives are involved in behaviour modification. However, an interesting difference is presented between token economy systems and behaviour modification programmes on this point. In the former category, six of the eight systems involve medium- or high-grade mental defectives and only one involves low-grade patients; whereas, in the latter category, the majority of programmes (9) involve low-grade patients. A relatively short length of operation of behaviour modification activities is evidenced, in general, by the survey. With the exception of two token economies and the points' systems, all activities are of less than 12 months' duration; and the majority of the behaviour modification programmes are of less than six months'. Amongst the various activities, a wide range of target behaviours is presented. Self-help skills are the most common category of targets, others being social and occupational skills. The establishment of appropriate behaviour to replace a behavioural deficit is the more common goal of activities. As a group, the individual behaviour modification programmes are unique in concentrating upon the elimination of behavioural problems. A strong impression obtained is that selection of a single behaviour target for concentration results in a high degree of specificifity of a programme, more stringent application of techniques and more precise methods of evaluation. Those activities in which a wide range of targets are involved tended to have correspondingly less specificity, less stringent application of techniques and poorer methods of evaluation from which effectiveness of training is difficult to ascertain. This finding relates to the distinction made between Behaviour Modification and behaviour modification, the conditions of the former being more easily met in single-target activities.

The survey study adds support to the argument that mental deficiency nurses are capable of a high degree of initiative and competence in behaviour modification of mental defectives. In addition to examples of their ability to initiate, implement and sustain behaviour modification programmes is exemplified, in some cases, their ability to undertake related research and to train and lead other nurses. In almost all of the situations observed, the problems of staff shortages and inadequacy of resources prevailed. Only one token economy system is able to maintain a stable group of staff and to involve some degree of staff selection, a probationary period for new staff and the possibility of increasing control over staffing levels and deployment. More of the behaviour modification programmes have established at least some control over selection and stability of the nursing staff. However, the practices of selection, of maintaining a minimum staff level and a core of permanent staff, and of controlling the involvement of temporary staff are the exception rather than the rule. It appeared that these nurses generally feel these practices to be desirable thus supporting the argument of Hall (1973, 1974), but do not consider them to be essential.

Almost without exception, nurses interviewed expressed the opinion that the present provisions of nurse training in behaviour modification are totally inadequate. They were highly critical of basic nurse training in this respect. Because formal training in behaviour modification is only now being developed (J.B.C.N.S. 1973; C.C.N.S., 1974), none of the nurses currently involved has been formally trained. Those nurses who are responsible for the initiation and implementation of currently operating practice and programmes have gained knowledge of behaviour modification principles from national workshops, conferences, books and films; and other nurses in addition

are now benefitting from training courses being developed within hospitals. Training appears to be more substantial in cases where psychologists or psychiatrists are involved with the behaviour modification activities. Where no explicit training of nurses takes place, their involvement remains undirected or dependent upon the leadership of the senior nurse concerned; and this amounts to minimal training of an 'apprenticeship' type. A minority of programmes have no related training or strong leadership. It was obvious in such cases that nurses remain uninformed, and are inconsistent or incompetent in applying behaviour modification technqiues. Thus, from the survey, the need for adequate nurse training is clearly identified and the nurses' own recognition of this is an important finding in this connection.

Not surprisingly, nurses interviewed in the survey study, tended to hold a very positive attitude towards behaviour modification. The general opinion was that the application of these techniques can be effective and successful in relation to a wide range of behavioural deficits and problems of mental defectives of all degrees of deficiency; that behaviour modification is a relevant, appropriate and powerful method of, or adjunct to, mental deficiency nursing; and that behaviour modification practice and programmes can be implemented in spite of problems prevailing in mental deficiency hospitals. Expression of such positive attitudes was a refreshing experience for the researcher. She had been disillusioned frequently by the negative attitudes expressed about behaviour modification by mental deficiency nurses at study days and refresher courses. Those holding negative attitudes tend to be nurses without any first-hand experience of behaviour modification. "You can't teach old dogs new tricks", "Behaviour modification is nothing new, we've been doing

it for years", "Giving patients rewards is like training animals" and "We've no time or staff, anyway" are but some of the remarks frequently made. Similar critism has been contained in letters to the nursing press. Vining (1972) writes in response to a report of a token economy (Baker, 1972) and questions the apparent absence of personalised patient care, compassion and love. Russell (1972) calls behaviour modification "American ballyhoo" and sees it to be only "a belated attempt by the psychologists to reburnish their tarnished credibility ... ". The contrasting positive attitudes of those nurses with first-hand experience only reinforces the recognition of the need to educate the mental deficiency nursing profession about behaviour modification in order to dispel the ignorance, the myths and the mis-information which exists. There is no doubt that the positive attitudeof nurses involved in behaviour modification developed from their first-hand experience. The observation of Stenger and Peck (1970) from their survey is applicable to the present one in that initial reactions were sceptical, but the definite structure and goal for patient care and outcomes of behaviour modification provided the basis of the development of a favourable and positive attitude.

## Conclusions

1. In over half of the mental deficiency hospitals (14 of 23 hospitals) in Scotland, nurses were found to be involved in behaviour modification activities. Thus, the involvement of mental deficiency nurses in behaviour modification can be considered to be fairly extensive. The recent innovation of the majority of the activities ongoing suggests that the extent of nurse involvement is increasing fairly rapidly at the present time and this, therefore, may be considered to be the developmental period of behaviour modification in mental

deficiency nursing.

2. A total of 888 mental defectives were involved in the activities surveyed. This represents 12.20% of the total population of hospitalised mental defectives in Scotland. Thus, behaviour modification can be considered to be a minority method only of treatment and training in mental deficiency at the present time. Patients of all ages (15 months - 70 years) and all levels of mental deficiency are involved. An absence of activities related to adult female patients is noted.

3. A major distinction was identified in the nature of nurse involvement as between that concerned with behaviour modification practice (in which behaviour modification is seen as integral to nursing care) and that concerned with behaviour modification programmes (in which behaviour modification is seen as a specific adjunct to nursing care). The former approach appears to result in a high degree of organisation, co-ordination and ordered progression of behaviour modification activities in the training and rehabilitation of patients. This approach was found in a minority of hospitals (n = 3), each of which is small. The high degree of commitment to behaviour modification by the senior nurse administrator in these hospitals is an interesting finding.

4. The nature of the nurses'involvement in behaviour modification programmes in the other 11 hospitals comprised involvement in Token Economy Systems (n = 8), Behaviour Modification Programmes (n = 13), Individual Behaviour Modification Programmes (n = 5) and miscellaneous activities (n = 3). Overall, these 29 behaviour modification programmes encompass a great variety of aims and objectives, although

particular concentration on basic self-help and social skills is evident.

5. The degree of stringency of application of the principles and techniques of behaviour modification varied. A distinction is offered between the highly stringent and specialised application of some programmes, and the less stringent and more generalised application of others ('Behaviour Modification' and 'behaviour modification'). Conditions which are required to be met in the correct use of the former description (i.e. Behaviour Modification) are identified. The Individual Behaviour Modification Programmes and the single-target Behaviour Modification Programmes are those which appear to satisfy these conditions most easily.

6. The majority of behaviour modification activities ongoing were initiated by nurses and almost all depend upon the nursing staff for their day-to-day implementation. About half of the activities do not have the involvement of other professions. In those which do, psychologists and psychiatrists are the professionals most commonly involved.

7. In almost all situations observed, the problem of staff shortage prevails. The practices of selection, maintenance of a minimum staffing level and control over mobility of staff are the exception rather than the rule. In general, nurses appear to consider that these practices are desirable but not essential.

8. None of the nurses currently involved in behaviour modification have been formally trained. Nurse training appears to be more

adequate where a psychologist or psychiatrist is available. In some cases, albeit a minority, nurse training is totally inadequate even for the nurses' practical involvement in the activity. The need for nurse training in behaviour modification at both basic and post-basic levels is urgent and this need is recognised clearly by those nurses involved.

9. Nurses involved in behaviour modification activities tend to hold a very positive and favourable attitude towards behaviour modification and consider it to be a relevant, appropriate and effective method of, and adjunct to, nursing care in mental deficiency.

CHAPTER 16:

GENERAL DISCUSSION: Behaviour Modification in Mental Deficiency Nursing.

Investigation of this subject has been undertaken from both specific and general viewpoints in the two studies comprising the research - the experimental and survey studies respectively. Each has been presented and discussed separately and conclusions drawn in relation to each individually. It remains to present some general points of discussion pertinent to the overall research subject. These derive from the findings of the two studies and from personal opinions of the researcher which have developed during the research period. It seems appropriate to introduce these opinions in order that a nurse's view on the development of behaviour modification in mental deficiency nursing is made available to the discussion which has largely been developed to date by members of other professions.

The function of behaviour modification in mental deficiency nursing must be considered in relation to the function of nursing within the field of mental deficiency. At this point in time, the latter remains ill-defined and the future of the mental deficiency nursing profession remains in some doubt. It is to be hoped that the Committee of Enquiry into Mental Handicap Nursing Care (The Jay Committee) will find it possible to present recommendations which are firm and feasible concerning future direction and policy development in mental deficiency nursing. The Batchelor Report (S.H.H.D., 1970) provided one of the major critical examinations of mental deficiency nursing early in this period of reappraisal. The Report indeed questioned the validity of the concept of mental deficiency nursing on the basis of being unable to identify any

technique peculiar to mental deficiency nursing. In a period of rapid social change, professional development and changing health needs, the concept and function of nursing must inevitably change accordingly. Describing the development of the profession, Baly (1973) concludes that " .. its strength lies in its ability to adapt and change to meet changing needs." Thus, the new functions of nurses may not resemble the traditional ones and, inevitably, previously distinct specialties within nursing may merge to become indistinguishable. The fundamental question in relation to mental deficiency is whether or not the nursing profession has a unique contribution to make in the future. There has been no bettered concept of nursing than that forwarded by Virginia Henderson (Henderson, 1964; Harmer and Henderson, 1958) in which she defines the unique function of the nurse as:

" .. To assist the individual, sick or well, in the performance of those activities contributing to health or its recovery (or to a peaceful death) that he would perform unaided if he had the necessary strength, will or knowledge. It is likewise her function to help the individual gain independence as rapidly as possible."

Referring to mental deficiency nursing, it is clear from this definition that nurses do perform, or ensure, the essential daily living tasks of mental defectives (that is; minimally, feeding, washing, dressing and toileting). This is an essential function and is the task that is unique to nurses. However, it is the function of promoting independence in patients which nurses in mental deficiency have failed to develop. The conventional function of the mental deficiency nurse is now generally considered to be inappropriate (e.g. Hegarty and Sutherland, 1973) within the context of developments

which have taken place in mental deficiency services at large. In this case, nursing has not changed to meet changing needs. These developments, which are integrated within the proposals of the White Paper, 1971 (Better Services for the Mentally Handicapped : H.M.S.O., 1971), are based on the recognition that mental defectives have a right to develop to their maximum potential and independence, and to live as 'normal' a life as possible. The recommendation of the Briggs Report (H.M.S.O., 1972) that 'a new caring profession' should emerge in mental deficiency reflects the recognition that the conventional role of the nurse is no longer appropriate to the total population of mental defectives, and that provision for community care will be increased. It is envisaged that the new profession will concentrate upon training and rehabilitation and will eventually become community-based. This recognition has been widely interpreted to propose a diminution in the contribution of nursing in the mental deficiency services. However, this would seem to be an unfounded fear. Nurses will probably provide a large workforce for the new profession (Thomas, 1973). In addition, the need for nurses to develop an emphasis on 'therapeutic' as well as 'physical' aspects of care is clearly identified in the Report. If a new profession does evolve, and if mental deficiency services become increasingly community-based, then nursing will probably remain a hospital-based profession with particular responsibility for the resultant predominantly low-grade population of mental defectives requiring institutional care. Nursing services would seem to be of particular relevance to this group of patients within the defined unique function of nursing in health care. The prevalence of the various incapacities of these patients is known (D.H.H.S. Census 1970: H.M.S.O., 1972). It is also now known that almost all of

these incapacities can be overcome, or at least alleviated, by training. Thus, nursing care can become 'therapeutic' in nature even if, and perhaps especially if, the nursing contribution of the future becomes confined to a low-grade hospitalised population of mental defectives. It is in this context that behaviour modification offers an unrivalled opportunity for nurses to develop a therapeutic approach to care. There now exists a large body of research in relation to the effective application of behaviour modification techniques to low- grade mental defectives in respect of the behaviour deficits and problems which may be associated with low-grade deficiency (Gardner, 1971 etc.). The experimental study serves to illustrate, in relation to the specific incapacity of incontinence, that behaviour modification techniques can be applied effectively by nurses within the patients' usual ward environment. The survey study describes in it findings other various applications of behaviour modification techniques by nurses to improve basic self-help and social skills in mental defectives. The function of behaviour modification in mental deficiency nursing can therefore be identified as one method of therapeutic nursing. Its function can remain relevant to the function of mental deficiency nursing whether nurses continue to provide care for patients with various degrees of deficiency in the hospital and the community contexts, or whether nursing services become confined to a low-grade hospital population of mental defectives only. Whatever the decision concerning the future function of mental deficiency nursing, behaviour modification principles and techniques can be utilised to increase the therapeutic component of nursing care.

The role of mental deficiency nurses in behaviour modification is inseparable from their function, but some possible variations in role can be identified. Behaviour modification has only recently emerged in this country as a significant method in nursing practice. The relatively short length of operation of many of the behaviour modification activities located from the survey study confirms that this is so. The nurse's role in these can be seen to vary from an innovative and autonomous one to one which is subordinate or complementary to that of the psychiatrist or psychologist. Nurses are not, or should not be, attempting to emulate the role in behaviour modification of these other professionals. Rather, nurses are concerned to adapt a particular theoretical framework for a particular therapeutic nursing role. Loomis and Horsley (1974) explicate this process of adaptation within an emergent concept in nursing which is called 'the nursing process'. This term conceptualises nursing as a process which comprises patient assessment and the planning, implementation and evaluation of nursing care based on the needs of the individual patient which are identified from assessment: (see Mitchell, 1973 and McFarlane, 1975). Loomis and Horsley consider operant learning theory to be one framework in which a scientific basis for nursing interventions can be developed. This particular approach, that of a behavioural nursing process, is shown to provide a scientific and systematic method of nursing applicable to mental deficiency nursing. From the survey study, and as mentioned by Stenger and Peck (1970), it was clear that nurses welcomed the structure and process for nursing care which behaviour modification offers.

The distinction made on the basis of findings from the survey study between 'behaviour modification practice' and 'behaviour modification programmes' highlights alternative adaptations of behaviour modification

principles to nursing practice. The former approach, in which behaviour modification is considered to be integral to all aspects of nursing care, can be seen to consider nursing as a behavioural process in the sense that Loomis and Horsley (1974) identify. This total approach was found to be operating in a minority of hospitals in the survey. It has much to commend it in providing co-ordination and progression in patient training which is particularly necessary for mental defectives who require continuing and wide-ranging rehabilitation. The commitment and enthusiasm of a senior nursing administrator and the small size of hospital were features peculiar to situations in which behaviour modification practice was ongoing. The more common mode of application was found to consist of specific behaviour modification programmes in which behaviour modification is considered as an adjunct to(rather than a method of) nursing practice. Group programmes were the most common type of behaviour modification programmes operating,with the two other main types being token economy systems and individual programmes. The nature of the characteristics which are involved in behaviour modification training, as opposed to other methods of training (such as habit training), is necessary to identify. In relation to this, a distinction has been offered between proper and loose usage of the term 'behaviour modification'. Conditions which are required to be met in the proper use of the term (Behaviour Modification) have been listed (after: Gardner, 1971; and Ullman and Krasner, 1965) and include appropriate and precise analysis and modification of the behaviour, and evaluation of the consequent behavioural change.

This analysis of what constitutes behaviour modification is relevant to its development in mental deficiency nursing as it is basic to the question of whether the role of the nurse is as a 'generalist'

or as a 'specialist'. Hall (1973) and Peck (1973) are amongst those to advocate a need for a generalist approach in which all nurses become, in the phraseology of Peck, "agents of behaviour change". Marks (1975), Hallam (1975) and Fraser and Cormack (1975) discuss the role of the nurse in behaviour therapy as one which is specific, selective and autonomous. The term 'nurse-therapist' is employed to describe this specialist role. Kiernan (1973) clearly identifies the need for a balance between the generalist and specialist role of the mental deficiency nurse in behaviour modification. He suggests that it is appropriate for a minority of nurses to be trained as specialists, if only because the availability of other professionals is limited, with a view to their planning and evaluating programmes which would be implemented by other nurses in a generalist role.

Nurse training in respect of behaviour modification can therefore be seen to require to develop to provide this balance between specialists and generalists. A specialist role clearly requires the acquisition of detailed theoretical knowledge and of expertise in the application of the theoretical principles to practice. In the majority of the behaviour modification activities studied in the survey, nurses did not have this level of knowledge or expertise. As a result, behaviour modification principles were being only loosely applied in many cases. The experimental study serves as an example of more stringent application of the principles - of 'Behaviour Modification' rather than 'behaviour modification'. For this type of nursing role, and particularly if there is a research component involved, specialist training is essential. The recent innovation of post-registration training in behaviour modification and behaviour therapy for nurses (J.B.C.N.S., 1973;

and C.C.N.S., 1974) can be considered to be an important development in this context. However, such training will be available for a minority of nurses only. It is hoped that nurses who complete these courses will be instrumental in designing, developing, ensuring implementation, and evaluating, behaviour modification programmes. The training of the majority of nurses as generalists (that is, those who actually implement and sustain the programmes) requires to be provided in basic nurse education and in in-service training courses. It is clearly established that training is required for effective application of behaviour modification techniques (Gelfand et al., 1967; Trudel et al., 1974; Buehler et al., (1966). Whereas psychologists (Hall, 1973; Kiernan, 1973; Peck, 1973) clearly recognise the need for training, such recognition has been slow to develop amongst nurses. The survey study did highlight recognition by nurses themselves of the need for training, both specialist and generalist. However, many nurses, particularly those without first-hand experience of behaviour modification, consider behaviour modification to be little more than 'giving rewards' and consequently, do not recognise the importance of training. As Loomis and Horsley (1974) note: ".. All too often a practitioner can assume that by knowing something about reinforcement and punishment, she is armed with all that she needs to treat patients. This assumption could not be further from the truth." Therefore, an important aspect related to specific nurse training in behaviour modification is the general requirement to educate the mental deficiency nursing profession at large about the nature of behaviour modification.

Having established that nurse training is important, there requires to be development and evaluation of methods of such training. There is as yet a paucity of useful analyses of the teaching

of behaviour therapy and behaviour modification in the literature. The personal experience of the researcher and the findings from the survey study suggest that, at present, most nurses who are applying behaviour modfication techniques to mental defectives are self-taught, and proceed principally by extrapolating information from the literature and from others with experience. There is general agreement that knowledge and skills are required in the areas of observation, behavioural analysis, techniques of behaviour change and methods of behavioural evaluation. It is to be hoped that the post-registration training courses(J.B.C.N.S. and C.C.N.S.) will provide the opportunity for systematic examination of training needs, methods of training and outcomes of training in respect of nurse training in particular.

Whether or not selection of nurses for involvement in behaviour modification is relevant and desirable is a further aspect requiring study. Selection and control of the nursing staff population were not involved in the experimental study. These features were found, in the survey study, to be the exception rather than the rule in the behaviour modification activities ongoing. The general opinion of nurses was that they are desirable features, but not essential ones. It has been suggested by the researcher that maintainence of a small core of permanent nursing staff would seem to be essential in order to provide at least some stability of staffing in a behaviour modification programme. However, the results of the experimental study suggest that absence of a minimum and/or improved nurse: patient ratio need not mitigate against effective implementation of a behaviour modification programme. In the survey study and from the findings of Hall (1973), great variations in nurse staffing levels are to be found in existence. Kiernan (1973) advocates

that to implement behaviour modification and to accomodate related nurse training requires a high nurse:patient ratio, in the region of 1:3. Perhaps the important point to stress in this context is that it is possible for behaviour modification to be effective even with a low nurse:patient ratio. However, obviously any improvement in staffing would be welcomed, and should be strived for in future policy development within mental deficiency nursing. Accompanying this must be the inculcation of appropriate attitudes towards the provision of therapeutic nursing care in view of the evidence which suggests that increasing staffing levels alone does not necessarily result in improved patient care (Gault, 1973). The whole question of staffing levels in behaviour modification activities requires to be investigated. The researcher fully supports the plea made by Kiernan (1973) for a review to provide accurate estimates of staffing requirements for behaviour modification programmes in mental deficiency.

From this discussion it is clear that much research is required into the subject of behaviour modification in mental deficiency nursing in order that its development be directed on the basis of knowledge and evidence. The present research has, as research does, presented many more questions than answers. However, it is hoped that this nursing study might provide the impetus for further nursing research within the subject of behaviour modification in mental deficiency nursing. Whatever decision is reached concerning the future function of mental deficiency nursing, behaviour modification undoubtedly can contribute towards ensuring that the therapeutic component of nursing care is improved to the benefit of mental defectives.

# APPENDICES

Appendix 1 :

1.1. : Recording of elimination responses
(Assessments 1-4)

DATE: NAME OF PATIENT: CODE:

INCONTINENCE AND TOILET ASSESSMENT RECORD

| TIME | URINE | FAECES | PATIENT WAS INCONTINENT | | PATIENT USED TOILET | | COMMENTS: | SIG-NATURE |
|---|---|---|---|---|---|---|---|---|
| | | | DISCOVERED BY NURSE | NOTIFIED BY PATIENT | PATIENT TAKEN | PATIENT 'ASKED TO GO' | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | |

Appendix 1 :

1.2. : Recording of elimination responses (Experiments I and II)

DATE: NAME OF PATIENT: CODE:

1. DAY INCONTINENCE RECORD:-

| Time | Urine | Faeces | Discovered by Nurse | Notified by Patient | Changing withheld for 15 mins. | Comments - Behaviour of patient, associated events | Signature |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

2. DAY TOILET RECORD:-

| Time | Urine | Faeces | Taken by Nurse | Patient 'asked' to go | Reinforcement given immediately | Comments - Behaviour of patient throughout | Signature |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Appendix 1:

1.3. : Behavioural analysis of incontinent and toilet behaviour.

INDIVIDUAL PATIENT BEHAVIOURAL ANALYSIS OF INCONTINENCE CHART.

NAME OF PATIENT: _____

PATIENT CODE [ | | | ]

SCHEDULE REF: A/72/P&C/IC.

| DATE | TIME COMMENCED. | URINE. | FAECES. | PATIENT WAS INCONTINENT. | | PATIENT USED TOILET. | | EQUIPMENT. | SITUATION. | CLOTHING OFF | CLOTHING ON | SITTING ON TOILET. | DESCRIPTION/ MICTURITION | TOILET PAPER | FLUSHING TOILET | WASHING HANDS | LANGUAGE | VOCABULARY | CONVERSATION | BEHAVIOUR (1) | BEHAVIOUR (2) | BEHAVIOUR (3) | BEHAVIOUR (4) | BEHAVIOUR (5) | PRE-TOILET BEHAVIOUR (1) | PRE-TOILET BEHAVIOUR (2) | POST-TOILET BEHAVIOUR | BEHAVIOUR OF NURSE | LANGUAGE, VOCAB., OTHER COMMENTS OR OBSERVATIONS. | TIME COMPLETED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | NURSE INITIATED | PATIENT INITIATED | NURSE INITIATED | PATIENT INITIATED | 4, 6. | 5, 7 | 9 | 10 | 11. | 12, 13. | 14 | 15 | 16. | 17, 18. | 19. | 20. | 21 | 22 | 23 | 24 | 25 | 26, 29 | 27, 30 | 28, 31. | - | SPECIFY: 17, 18, 19, 20, 26, 29, 27, 30. 28. 31. | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

## INDIVIDUAL PATIENT BEHAVIOURAL ANALYSIS OF INCONTINENCE.

CODE FORM FOR USE WITH
SCHEDULE AT/72/BAC/AC
(AND " . AT/72/BAS/AC)

| SCHEDULE REFERENCE | CODE | ITEM. |
|---|---|---|
| 4, 6 | | EQUIPMENT. |
| | 0 | W.C. |
| | 1 | COMMODE |
| | 2 | POTTY. |
| | 3 | URINAL |
| 5, 7 | | SITUATION |
| | 0 | TOILET ANNEXE |
| | 1 | DORMITORY AREA |
| | 2 | 'DAY' AREA. |
| 9,10 | | CLOTHING (OFF) BEFORE USING TOILET )<br>CLOTHING (ON) AFTER USING TOILET ) |
| | 0 | Independently takes off/puts on clothing appropriately. |
| | 1 | Is helped to take off/put on clothing appropriately. |
| | 2 | Clothing taken off/put on by nurse. |
| 11 | | SITTING ON TOILET SEAT. |
| | 0 | Patient sits on toilet seat without help. |
| | 1 | Patient sits on toilet seat with help. |
| | 2 | Patient is placed on toilet seat. |
| | 3 | Patient is restrained to sit on toilet seat. |
| 12,13 | | DEFAECATION/URINATION. |
| | 0 | Patient defaecated /urinates in toilet. |
| | 1 | Patient defaecates/urinates in toilet annex, but on to floor. |
| | 2 | Patient defaecates/urinates in toilet, but soils clothing. |
| | 3 | Patient defaccates/urinates in ward or dorm. inconctinently. |
| 14. | | TOILET PAPER. |
| | 0 | Patient uses toilet paper appropriately. |
| | 1 | Patient is helped to use toilet paper. |
| | 2 | Patient is 'cleaned up' by nurse. |
| | 3 | Patient uses toilet paper inappropriately. |
| 15. | | FLUSHING TOILET. |
| | 0 | Patient flushes toilet after use. |
| | 1 | Patient is helped to flush toilet after use. |
| | 2 | Patient does not flush toilet after use |
| 16. | | WASHING HANDS. |
| | 0 | Washes hands after using toilet |
| | 2 | Is helped by nurse to wash hands. |
| | 3 | Does not wash hands at all. |
| 17,18 | | LANGUAGE. |
| | 0 | Indicates need for toilet by appropriate statements. |
| | 1 | Indicates " " " " vocal noises. |
| | 2 | " " " " " gestures. |
| | 3 | " " " " " other means. |
| | 4 | Does not indicate need for toilet |
| | | (Same for 'indicates he has been incontinent .....) N.B. Specify. |
| 19 | | VOCABULARY. |
| | 0 | Patient has no vocabulary of toilet or incontinent behaviour. |
| | 1 | Patient has some " " " " " " |
| | 2 | Patient has complete " " " " " " |
| | | N.B. SPECIFY. |
| 20 | | COMPREHENSION. |
| | 0 | Has no comprehension of statements or instructions 're toilet'. |
| | 1 | Has some " " " " " " " |
| | 2 | Has complete " " " " " " " |
| | | N.B. SPECIFY. |
| 21 | | TOILET BEHAVIOUR (1): VIOLENT AND DESTRUCTIVE |
| | 0 | Has violent temper/temper tantrums. |
| | 1 | Damages toilet equipment. |
| | 2 | Threatens or does physical violence. |
| | 3 | Soils own property. |
| | 4 | Soils others' property. |
| | 5 | Does physical violence to self. |
| 22 | | TOILET BEHAVIOUR (2): ANTI-SOCIAL. |
| | 0 | Teases others, gossips about others' toilet behaviour. |
| | 1 | Manipulates others' toilet behaviour. |
| | 2 | Disrupts others' toilet behaviour. |
| | 3 | Uses profane or hostile language . |
| 23. | | TOILET BEHAVIOUR (3): REBELLIOUS. |
| | 0 | Ignores regulations or regular routines. |
| | 1 | Resists following instructions, requests, orders. |
| | 2 | Runs away or attempts to run away. |
| | 3 | Lies or cheats about own toilet behaviour. |
| 24 | | TOILET BEHAVIOUR (4): UNACCEPTABLE. |
| | 0 | Smells everything. |
| | 1 | Hoards faeces or urine. |
| | 2 | Plays with faeces or urine. |
| | 3 | Drinks from toilet. |
| | 4 | Puts faeces in mouth. |
| | 5 | Takes off all clothing while in toilet. |
| | 6 | Exposes self improperly/excessively during toileting. |
| | 7 | Attempts to eliminate in public. |
| 25 | | TOILET BEHAVIOUR (5) : PSYCHOLOGICAL. |
| | 0 | Demands excessive attention or praise. |
| | 1 | Has hypochandrial tendencies re elimination. |
| 26, 29 | | PRE-TOILET/INCONTINENT BEHAVIOUR (1): HABITS & TENDENCIES. |
| | 0 | Removes clothing. |
| | 1 | Appears insecure or frightened |
| | 2 | Has hyperactive tendencies. |
| | 3 | Becomes noticeably withdrawn. |
| | 4 | Indulges in oral habits. |
| | 5 | Constantly chooses a favourite spot * |
| | 6 | Holds genitals. |
| | 7 | Adopts specific posture * |
| | 8 | Stereotyped behaviour * |
| | | (N.B. SPECIFY * ) |
| 27, 30 | | PRE-TOILET/INCONTINENT BEHAVIOUR (2): ASSOCIATED ACTIVITIES. |
| | 0 | Meal times. |
| | 1 | Bed-time |
| | 2 | Getting up from bed or sleep. |
| | 3 | School. |
| | 4 | Outings. |
| | 5 | Visiting times. |
| | 6 | Contact with a particular person * (N.B. SPECIFY *) |
| 28, 31 | | POST-TOILET/INCONTINENT BEHAVIOUR: HABITS & TENDENCIES. |
| | | SPECIFY. |
| NO SCHEDULE REFERENCE | | BEHAVIOUR OF NURSE THROUGHOUT INTERACTION OBSERVED. |
| | 0 | Nurse ignores toilet behaviour of child. |
| | 1 | Nurse punishes toilet behaviour of child. |
| | 2 | Nurse reinforces toilet behaviour of child. |
| | 3 | Nurse educates child re toilet behaviour. |
| | 4 | General attitude to patient is positive (i.e. verbal, encouraging. pleasant). |
| | 5 | General attitude to patient is neutral. |
| | 6 | General attitude to patient is negative (i.e., non-verbal, reprimanding, unpleasant) |
| | 7 | General attitude to task is positive (i.e., enthusiastic, efficient, enjoying task). |
| | 8 | General attitude to task is neutral. |
| | 9 | General attitude to task is negative (i.e., enthusiastic, not efficient, not enjoying task) |
| | X | Nurs states that she finds jobs unpleasant. |

Appendix I :
1.4. : Isolation of reinforcers.

Schedule : ISOLATION OF REINFORCERS PATIENT CODE :

Dates of observation period : ..... to .....

METHOD 1 :

(a) Items specified by nurses as reinforcers :-

(b) Items specified as having aversive properties:-

METHOD 2 :

Free observation of reinforcing incidents (Describe location, nurses, situation, reinforcing item, patient behaviour and patient response).

METHOD 3:

Testing of reinforcing properties of potential reinforcers :-

| ITEM | SITUATION | RESPONSE | | |
|---|---|---|---|---|
| | | +ve | neutral | -ve |
| 1. Smarties | | | | |
| 2. Biscuits | | | | |
| 3. Chocolate | | | | |
| 4. Crisps | | | | |
| 5. Jelly babies | | | | |
| 6. Cup of water | | | | |
| 7. Cup of juice | | | | |
| 8. Drinking fountain | | | | |
| 9. "Good boy" / "Good girl" | | | | |
| 10. "Very good" / "Well done" | | | | |
| 11. Cuddle | | | | |
| 12. Pat on head | | | | |
| 13. Kiss | | | | |
| 14. Lift in air | | | | |
| 15. Tickle | | | | |
| 16. Put on knee | | | | |
| 17. Smile | | | | |
| 18. Piece of paper | | | | |
| 19. Book | | | | |
| 20. Postcard/picture | | | | |
| 21. Doll /toy | | | | |
| 22. Ball | | | | |
| 23. Rag/piece of cloth | | | | |
| 24. Other: | | | | |
| 25. Other: | | | | |

REINFORCERS ISOLATED : I.
II.
III.
IV.

# THE PRIMARY
# PROGRESS ASSESSMENT CHART
## OF SOCIAL DEVELOPMENT

6th Edition

by

H. C. GUNZBURG, M.A., Ph.D., F.B.Ps.S.

.....

(Name of Teaching Centre)

Name: ..... Date of Birth:..... Age.....

Address: .....

.....

Date of Assessment: ..... Signature of Assessor: .....

**PURPOSE:** The Primary P-A-C form has been designed to give a visual impression of general functioning on the lowest stages of social development. The most important skills acquired during the first years of normal physical, social and mental development are described under four headings: Self-help, Communication, Socialisation and Occupation. Re-assessments indicate whether there has been development and progress during the period under review.

**CONSTRUCTION:** The skills are arranged in order of maturational development which facilitates a direct check of the level of achievement in different areas. The letters a to f indicate the approximate sequence of stages in development in particular areas.

**SCORING:** Since skills have been arranged in an ascending order of complexity, it can be generally assumed that mastery of the more advanced skills in a particular area will depend on having passed through the preceding steps. A good deal of time can therefore often be saved by ascertaining carefully the highest level of achievement in the sub-sections of Self-Help and Communication and to credit automatically skills on all levels preceding it in the same subsection. There are, however, exceptions, particularly in Socialisation and Occupation, and the assessor must ascertain social functioning by careful probing in both directions ("upwards and downwards") to establish a possible 'scatter'.

Shade heavily all numbered areas in the Diagram representing skills which are performed easily and/or frequently. Skills which have not been acquired yet should be shaded lightly. Areas which can not be assessed should be left blank. Assessments should be repeated at regular six monthly intervals.

Credit in full areas which have been supplanted by more skilled performances on higher levels by shading them heavily in the Diagram.

**Adhere closely to the criteria described in the P-A-C MANUAL**

**GENERAL REMARKS:** The P-P-A-C form is suitable for the very young normal child and for the profoundly mentally handicapped child and adult. Later stages of social development are assessed with the help of the P-A-C 1 and P-A-C 2. The assessment will draw attention to specific weaknesses and should lead to remedial action where advisable. It will also be necessary to establish whether a young child is average, superior or backward in social attainments **compared with mentally handicapped children of the same age.** The **P-P-E-I (Primary Progress Evaluation Index)** should be used for such comparisons as it indicates the average attainments of young mentally handicapped children of various age groups.

## SELF-HELP

### Eating

1. Sucks food well .... .... .... .... .... .... .... .... a
2. Shows recognition of food .... .... .... .... .... .... .... .... a
18. Puckers his mouth for food .... .... .... .... .... .... .... b
19. Takes semi-solids from spoon .... .... .... .... .... .... .... b
37. Uses fingers for eating but does not chew .... .... .... .... .... c
38. Rubs spoon across plate—puts it to mouth for licking .... .... .... c
56. Chews biscuits, rusks, etc. .... .... .... .... .... .... .... d
57. Prepares edible food by peeling (banana) or unwrapping without reminder being necessary .... .... .... .... .... .... .... .... d
58. Uses spoon (may spill some food) .... .... .... .... .... .... d
76. Drinks from cup unaided without spilling and holds it .... .... .... e
77. Eats unaided .... .... .... .... .... .... .... .... .... e
106. Uses a fork without difficulty (food can be cut and prepared) .... .... f
107. Capable of taking a drink by himself without help .... .... .... .... f

### Mobility

3. Balances his head .... .... .... .... .... .... .... .... a
4. Sits with slight support .... .... .... .... .... .... .... .... a
20. Sits with fairly straight back and without support for short periods .... b
21. Bounces up and down .... .... .... .... .... .... .... b
39. Pulls himself upright—stands when holding on .... .... .... .... .... c
40. Gets about by creeping or crawling .... .... .... .... .... .... c
59. Devises means of getting objects he wants .... .... .... .... .... d
60. Walks with aid .... .... .... .... .... .... .... .... d
78. Walks upstairs, both feet together on each step .... .... .... .... e
79. Walks downstairs, both feet together on each step .... .... .... .... e
108. Runs .... .... .... .... .... .... .... .... .... f
109. Pushes or pulls large objects .... .... .... .... .... .... .... f

### Toilet and Washing

22. Uses pot (or toilet chair) when placed on it .... .... .... .... .... b
41. Bowel movements are generally regular .... .... .... .... .... .... c
61. Has established some regularity during day time and waits a reasonable time before attended to .... .... .... .... .... .... .... d
62. Indicates when wet and/or dirty .... .... .... .... .... .... d
80. Bladder control during day, but has to go quite often .... .... .... e
81. "Toilet trained" with infrequent accidents .... .... .... .... .... e
110. Asks to go to the toilet or goes by himself .... .... .... .... .... f
111. Climbs on lavatory seat .... .... .... .... .... .... .... .... f
112. Attends to toilet needs without help except for wiping .... .... .... f
113. Dries hands adequately without much assistance .... .... .... .... f

### Dressing

42. Co-operates passively when being dressed .... .... .... .... .... c
63. Holds out his arms and feet when being dressed .... .... .... .... d
82. Assists in getting dressed .... .... .... .... .... .... .... e
83. Pulls off socks .... .... .... .... .... .... .... .... e
114. Removes **and** puts on simple articles of clothing .... .... .... .... f
115. Unbuttons accessible buttons .... .... .... .... .... .... .... f

## COMMUNICATION

### From

5. Throaty noises, cries .... .... .... .... .... .... .... .... a
6. Coos .... .... .... .... .... .... .... .... .... .... a
23. Mmmm or ssss sounds .... .... .... .... .... .... .... .... b
24. Polysyllabic vowels—iii, rrr, etc. .... .... .... .... .... .... b
25. Two syllables—da-da, ba-ba, etc. .... .... .... .... .... .... b
43. One clear word .... .... .... .... .... .... .... .... c
44. Three to four clear words .... .... .... .... .... .... .... c
64. Incipient jargon (many intelligible words) .... .... .... .... .... d
65. Twenty single words .... .... .... .... .... .... .... .... d
84. Two word combinations—daddy go, bye car, etc. .... .... .... .... e
85. Three word sentences—want a drink, etc. .... .... .... .... .... e
86. Pronouns—me, my .... .... .... .... .... .... .... .... e
87. Refers to himself by his own name .... .... .... .... .... .... e
88. Uses names of familiar objects .... .... .... .... .... .... .... e
116. Constantly asks questions—What's that? What's this? .... .... .... f

### COMMUNICATION—continued

117. Refers to himself as "I" .... .... .... .... .... .... .... .... f
118. Uses question form "Why" . . . ?" .... .... .... .... .... .... f
119. Expresses feelings, desires, problems verbally .... .... .... .... f
120. Able to tell a story, relates experiences in a coherent way .... .... .... f
121. Gives full name on request .... .... .... .... .... .... .... f

### To

7. Listens to music .... .... .... .... .... .... .... .... .... a
8. Searches for sound with eyes .... .... .... .... .... .... .... a
9. Turns head to sound .... .... .... .... .... .... .... .... a
26. Follows moving objects with eyes .... .... .... .... .... .... b
27. Looks around him .... .... .... .... .... .... .... .... b
28. Copies sounds when he hears them .... .... .... .... .... .... b
29. Responds to "No" .... .... .... .... .... .... .... .... b
45. Hands objects on request .... .... .... .... .... .... .... c
46. Responds to questions—e.g. Where is your dress?—if objects are in sight c
66. Responds to directions—e.g. Come here .... .... .... .... .... d
67. Listens to rhythm and is interested in repetition of sounds .... .... .... d
89. Obeys simple instructions .... .... .... .... .... .... .... e
90. Listens to simple stories .... .... .... .... .... .... .... e
91. Understands orders containing 'on, in, behind, under, above, in front of, on top of, underneath' .... .... .... .... .... .... .... .... e
92. Can differentiate correctly between **one** thing and **many** things .... .... e
122. Listens to more varied and longer stories .... .... .... .... .... f
123. Listens and can be reasoned with verbally .... .... .... .... .... f
124. Fetches on demand, one or two things, e.g. "give me two books" .... .... f

## SOCIALISATION

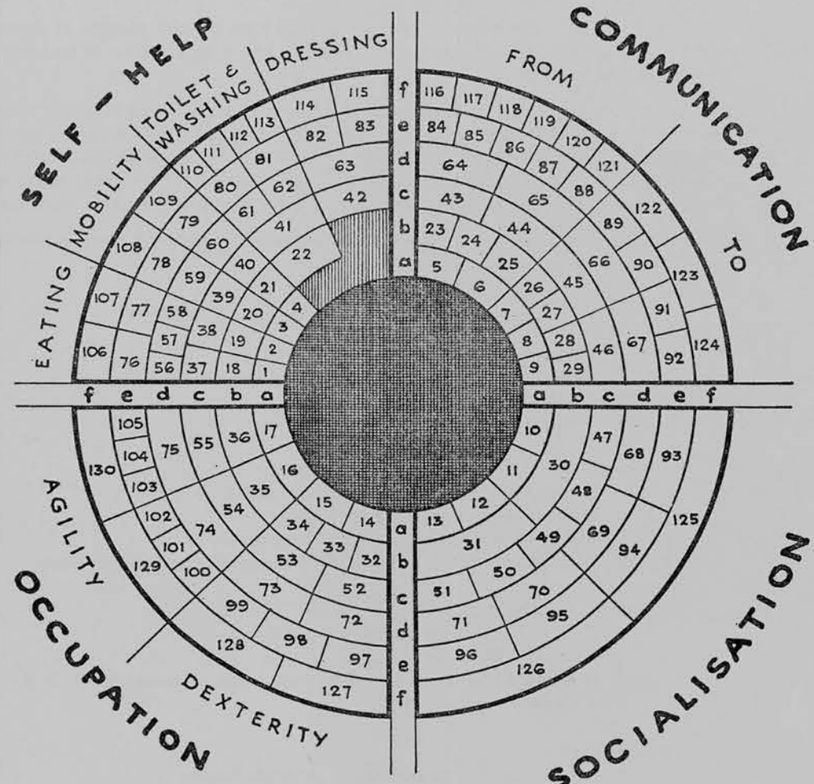
10. Expression shows awareness .... .... .... .... .... .... .... a
11. Reaches, smiles and vocalizes .... .... .... .... .... .... .... a
12. Squirms and responds to people .... .... .... .... .... .... .... a
13. Recognizes familiar people .... .... .... .... .... .... .... a
30. Shows interest in strangers by watching their movements .... .... .... b
31. Responds to facial expression, e.g. returns smile .... .... .... .... b
47. Plays 'patacake' .... .... .... .... .... .... .... .... c
48. Gets attention by making noises .... .... .... .... .... .... c
49. Wants adult approval for good behaviour .... .... .... .... .... c
50. Tries to make others laugh .... .... .... .... .... .... .... c
51. Shows affection .... .... .... .... .... .... .... .... .... c
68. Looks at mirror image with interest .... .... .... .... .... .... d
69. Claims possessions as own .... .... .... .... .... .... .... d
70. Shows objects and offers them .... .... .... .... .... .... .... d
71. Waves Bye-Bye .... .... .... .... .... .... .... .... .... d
93. Plays **in company** with others but does not yet co-operate with others .... e
94. Has learnt to respond to other people as they desire .... .... .... e
95. Fetches and carries on request .... .... .... .... .... .... e
96. Is pleased when shown pictures in books .... .... .... .... .... e
125. Waits "his turn", can "share" at times .... .... .... .... .... f
126. Helps in domestic tasks, e.g. clearing table, sweeping, dusting, etc. .... f

## OCCUPATION

### Dexterity (Fine Finger Movements)

14. Hands are able to hold objects for short periods .... .... .... .... a
15. Hands are able to grasp objects when offered .... .... .... .... .... a
32. Transfers things from hand to hand .... .... .... .... .... .... b
33. Picks up small objects between finger and thumb .... .... .... .... b
34. Uses index finger to explore .... .... .... .... .... .... .... b
52. Marks with pencil or crayon .... .... .... .... .... .... .... c
53. Puts hand in container, grasps all objects in it .... .... .... .... c
72. Spontaneous scribble with crayon or pencil .... .... .... .... .... d
73. Puts bricks, boxes, etc., upon another .... .... .... .... .... d
97. Can string large beads .... .... .... .... .... .... .... .... e
98. Can unscrew lids with a twisting movement, or turn doorknobs .... .... e
99. Pours water from one cup into another .... .... .... .... .... e
127. Can cut paper with scissors .... .... .... .... .... .... .... f
128. Handles breakable objects (e.g., crockery) reasonably well .... .... f

Name..... Age.....




### Agility (Gross Motor Control)

16. Tries to reach objects with hands but overshoots .... .... .... .... a
17. Manipulates objects .... .... .... .... .... .... .... .... a
35. Reaches for objects by leaning forward .... .... .... .... .... b
36. Throws objects to floor .... .... .... .... .... .... .... b
54. Looks for fallen objects by bending over .... .... .... .... .... c
55. Aligns two or more cubes or bricks .... .... .... .... .... .... c
74. Can kick ball without falling .... .... .... .... .... .... .... d
75. Throws ball intentionally without falling .... .... .... .... .... d
100. Picks up objects without falling .... .... .... .... .... .... e
101. Can jump with both feet .... .... .... .... .... .... .... e
102. Opens doors .... .... .... .... .... .... .... .... .... e
103. Climbs on chair and can stand on it .... .... .... .... .... .... e
104. Seats himself at table .... .... .... .... .... .... .... .... e
105. Takes lid off and puts it back on a box .... .... .... .... .... e
129. Jumps with both feet off bottom step without requiring support .... .... f
130. Stands on one foot for short periods .... .... .... .... .... .... f

Appendix 1 :
1.6. : Record of linen usage.

RECORD OF LINEN USAGE DUE TO INCONTINENCE

DAY: [ ]

SANITARY ANNEXE: [ ]

| | TIME | NUMBER OF ITEMS OF WET LINEN | NUMBER OF ITEMS OF SOILED LINEN | SIG-NATURE |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Appendix 1 :
1.7. : Programme schedule.

• BEHAVIOUR MODIFICATION TOILET-TRAINING PROGRAMME •

NAME : _____ CODE : [ ]

COMMENCED : [ ][ ][ ][ ][ ][ ]

BASELINE DATA OF INCONTINENCE AND TOILET BEHAVIOUR :-

TRAINING ENVIRONMENT :-

EQUIPMENT TO BE USED :-

DETAILS re USE OF NAPPIES (or OTHER CLOTHING) :-

REINFORCERS :-

TIMES TO BE TAKEN TO THE TOILET :-

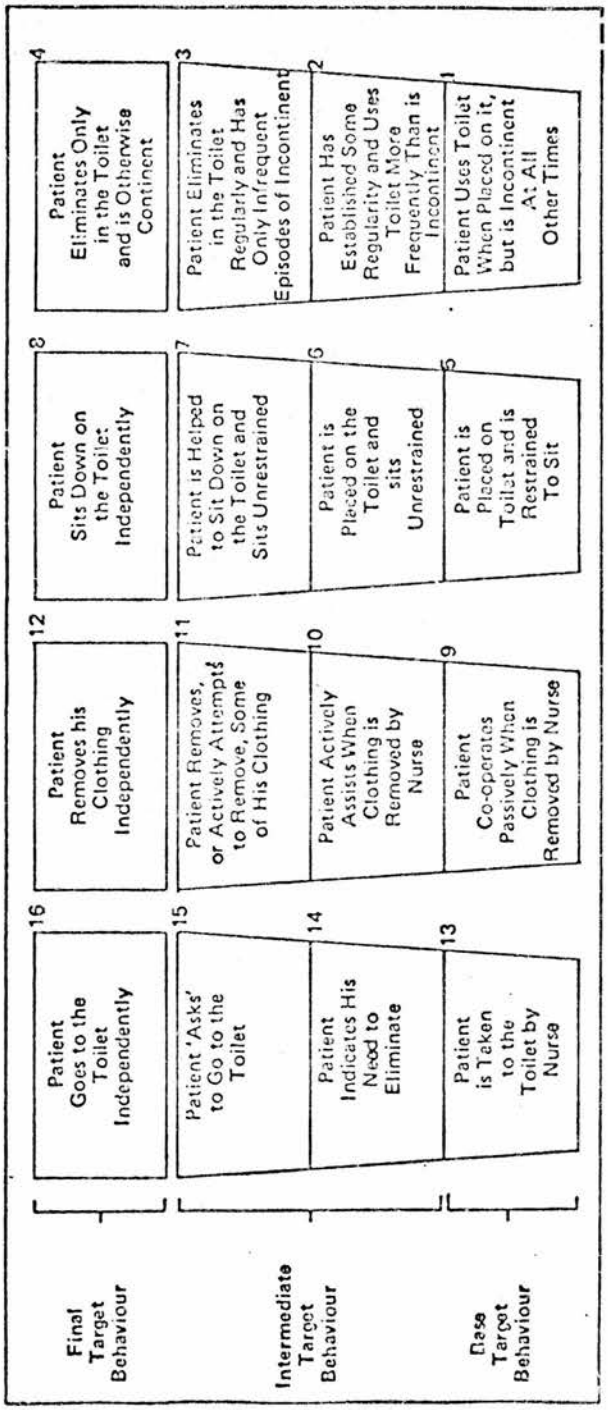
| | ON RISING | AFTER BREAKFAST | MID-MORNING | AFTER LUNCH | MID-AFTERNOON | AFTER TEA | BATH TIME | BED TIME | FROM BED | DURING NIGHT | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (APPX) | 7-8 | 9-9:30 | 10:30-11 | 12-1PM | 3-3:30 | 5-5:30 | 6-7 | 7-8PM | 9-9:30 | | | |
| | | | | | | | | | | | | |

PROGRAMME AND PROGRESS REVIEWS :-

| | |
|---|---|
| DAY | |
| DAY | |
| DAY | |
| DAY | |
| DAY | |
| DAY | |

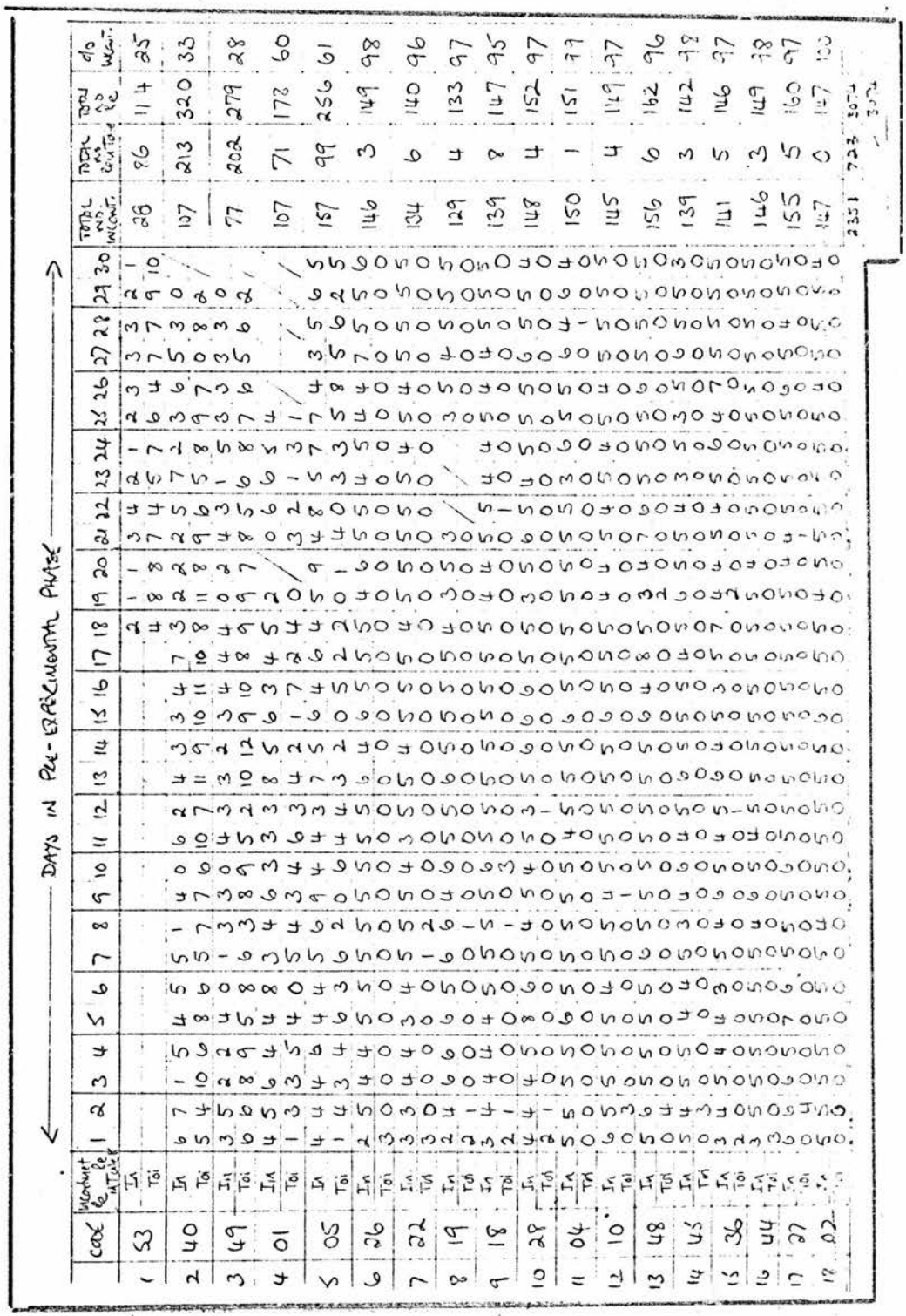
Appendix 1 :

1.8. : Model of shaping toilet behaviour.



Appendix 2 :

2.1. : Elimination response rates of patients in experimental group I during the pre- experimental phase of Experiment I.



Appendix 2 :

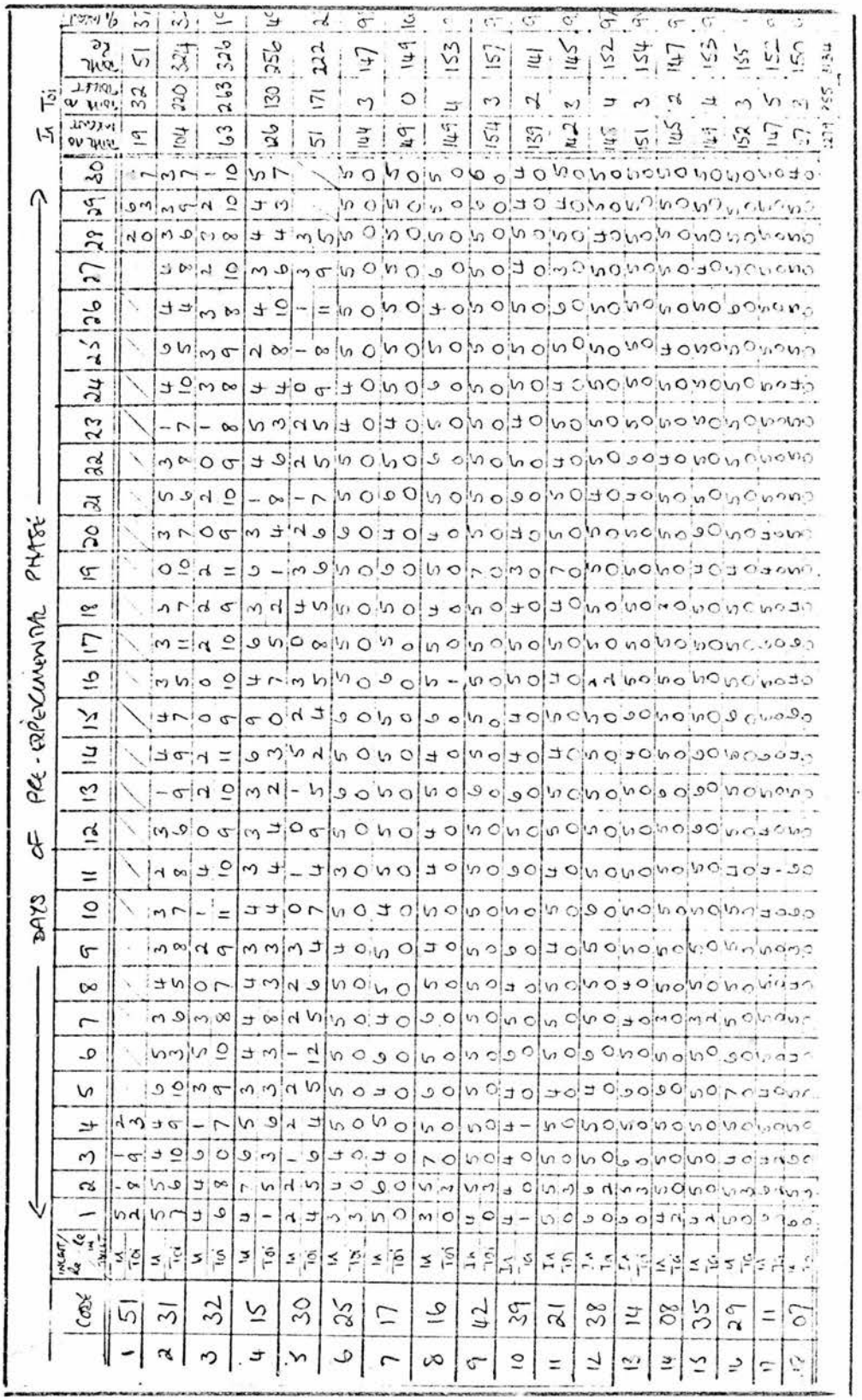
2.2. : Elimination response rates of patients in experimental group I during the post-experimental phase of Experiment I.

← DAYS IN POST-EXPERIMENTAL PHASE →

| | Code | Nacl or Pe | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | Nbre de Nacl ingérés | Nbre de Nacl excrétés | % excrétion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 53 | Ex | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 258 | 2 |
| | | Toi | 8 | 8 | 9 | 9 | 10 | 10 | 8 | 10 | 10 | 8 | 9 | 7 | 9 | 9 | 9 | 7 | 9 | 9 | 8 | 8 | | | |
| 2 | 40 | Ex | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 19 | 260 | 7 |
| | | Toi | 7 | 7 | 10 | 8 | 7 | 8 | 8 | 8 | 7 | 11 | 9 | 8 | 7 | 8 | 10 | 8 | 8 | 10 | 9 | 8 | | | |
| 3 | 49 | Ex | 1 | 1 | 1 | 2 | 0 | 2 | 2 | 2 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 29 | 262 | 10 |
| | | Toi | 9 | 9 | 6 | 8 | 7 | 8 | 7 | 10 | 7 | 11 | 13 | 8 | 8 | 9 | 10 | 7 | 10 | 12 | 8 | 8 | | | |
| 4 | 01 | Ex | 3 | 1 | 3 | 0 | 3 | 2 | 4 | 1 | 0 | 2 | 3 | 2 | 1 | 2 | 1 | 2 | 1 | 3 | 1 | 1 | 40 | 307 | 13 |
| | | Toi | 7 | 7 | 6 | 9 | 8 | 7 | 6 | 9 | 10 | 8 | 5 | 8 | 10 | 9 | 8 | 8 | 7 | 8 | 9 | 10 | | | |
| 5 | 05 | Ex | 7 | 2 | 3 | 3 | 1 | 3 | 3 | 4 | 2 | 4 | 3 | 3 | 5 | 3 | 0 | 2 | 0 | 2 | 2 | 0 | 67 | 327 | 21 |
| | | Toi | 7 | 7 | 7 | 9 | 6 | 6 | 7 | 6 | 9 | 10 | 7 | 11 | 9 | 10 | 11 | 8 | 10 | 8 | 8 | 11 | | | |
| 6 | 26 | Ex | 3 | 2 | 2 | 1 | 0 | 1 | 2 | 1 | 3 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 1 | 35 | 300 | 12 |
| | | Toi | 6 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 10 | 11 | 7 | 11 | 8 | 9 | 8 | 12 | 6 | 10 | 10 | | | |
| 7 | 22 | Ex | 2 | 3 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 22 | 269 | 8 |
| | | Toi | 8 | 8 | 8 | 7 | 9 | 7 | 7 | 9 | 10 | 9 | 10 | 8 | 9 | 7 | 10 | 7 | 10 | 10 | 11 | 10 | | | |
| 8 | 19 | Ex | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 0 | 2 | 2 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 43 | 291 | 15 |
| | | Toi | 7 | 8 | 7 | 7 | 7 | 7 | 6 | 8 | 9 | 9 | 9 | 9 | 9 | 8 | 11 | 7 | 6 | 9 | 10 | 9 | | | |
| 9 | 18 | Ex | 2 | 2 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 23 | 278 | 8 |
| | | Toi | 8 | 8 | 10 | 9 | 9 | 7 | 7 | 9 | 10 | 13 | 10 | 10 | 10 | 9 | 10 | 9 | 10 | 8 | 10 | 11 | | | |
| 10 | 28 | Ex | 0 | 2 | 1 | 2 | 3 | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 26 | 282 | 8 |
| | | Toi | 11 | 8 | 9 | 9 | 10 | 8 | 8 | 12 | 10 | 10 | 10 | 10 | 10 | 9 | 9 | 9 | 12 | 10 | 9 | 10 | | | |
| 11 | 04 | Ex | 4 | 2 | 2 | 0 | 3 | 4 | 2 | 2 | 0 | 2 | 3 | 2 | 3 | 2 | 1 | 2 | 1 | 0 | 1 | 0 | 51 | 241 | 18 |
| | | Toi | 7 | 6 | 6 | 9 | 7 | 9 | 8 | 6 | 9 | 6 | 9 | 10 | 8 | 8 | 8 | 8 | 11 | 8 | 9 | 8 | | | |
| 12 | 10 | Ex | 2 | 2 | 5 | 5 | 5 | 3 | 1 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 2 | 3 | 2 | 74 | 219 | 25 |
| | | Toi | 6 | 5 | 5 | 5 | 7 | 7 | 7 | 6 | 6 | 7 | 7 | 8 | 7 | 7 | 9 | 8 | 8 | 6 | 7 | 8 | | | |
| 13 | 48 | Ex | 4 | 3 | 1 | 3 | 2 | 3 | 2 | 4 | 3 | 2 | 6 | 3 | 3 | 2 | 1 | 3 | 3 | 3 | 2 | 2 | 85 | 214 | 28 |
| | | Toi | 5 | 5 | 7 | 9 | 9 | 9 | 8 | 6 | 6 | 6 | 3 | 7 | 9 | 9 | 9 | 6 | 7 | 10 | 8 | 7 | | | |
| 14 | 45 | Ex | 2 | 5 | 5 | 4 | 1 | 4 | 5 | 4 | 4 | 2 | 1 | 2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 79 | 217 | 27 |
| | | Toi | 6 | 5 | 5 | 7 | 8 | 5 | 7 | 8 | 7 | 9 | 7 | 7 | 6 | 8 | 8 | 8 | 7 | 9 | 7 | 6 | | | |
| 15 | 36 | Ex | 5 | 5 | 5 | 0 | 0 | 7 | 4 | 0 | 4 | 4 | 0 | 5 | 0 | 0 | 0 | 4 | 5 | 3 | 5 | 5 | 155 | 0 | 100 |
| | | Toi | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 16 | 44 | Ex | 5 | 7 | 6 | 6 | 6 | 4 | 4 | 4 | 3 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 147 | 11 | 93 |
| | | Toi | 0 | 0 | 3 | 6 | - | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 17 | 27 | Ex | 6 | 6 | 6 | 3 | 5 | 5 | 3 | 6 | 7 | 4 | 5 | 5 | 8 | 7 | 0 | 6 | 6 | 7 | 6 | 5 | 166 | 2 | 99 |
| | | Toi | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| 18 | 02 | Ex | 6 | 6 | 5 | 6 | 5 | 6 | 6 | 0 | 6 | 5 | 5 | 6 | 5 | 6 | 5 | 5 | 7 | 7 | 6 | 5 | 173 | 3 | 98 |
| | | Toi | 0 | 0 | 2 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | 1238 | 3558 | 4796 |
| | | | | | | | | | | | | | | | | | | | | | | | =4776 | | |

Appendix 2 :

2.3. Elimination response rates of patients in the control group during the pre-experimentalphase of Experiment I.



Appendix 2 :

2.4. : Elimination response rates of patients in the control group during the post-experimental phase of Experiment I.

| | Code | Wert in % des Anfangswertes | DAYS OF POST-EXPERIMENTAL PHASE → | | |

Appendix 2 :

2.5. · Elimination response rates of patients in the experimental group (EII) during the pre- experimental phase of Experiment II.




| Pat. | Code | Urea Re / Re in Toilet | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | Total No. Re | Total Re in Toilet | Total Re | % Urea |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 51 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 128 | 121 | 249 | 51 |
| 2 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 111 | 193 | 304 | 37 |
| 3 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 91 | 192 | 283 | 32 |
| 4 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 120 | 184 | 304 | 39 |
| 5 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 83 | 186 | 269 | 31 |
| 15 | 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 162 | 0 | 162 | 100 |
| 10 | 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 149 | 0 | 149 | 100 |
| 11 | 21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 169 | 0 | 169 | 100 |
| 6 | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 163 | 0 | 163 | 100 |
| 9 | 42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 174 | 0 | 174 | 100 |
| 13 | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 174 | 0 | 174 | 100 |
| 14 | 08 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 146 | 0 | 146 | 100 |
| 18 | 07 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 170 | 0 | 170 | 100 |
| 7 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 166 | 0 | 166 | 100 |
| 8 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 163 | 0 | 163 | 100 |
| 15 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 176 | 0 | 176 | 100 |
| - | 33 | In Toi | 5 0 | 6 0 | 5 0 | 6 0 | 7 0 | 7 0 | 4 0 | 7 0 | 4 0 | 5 0 | 5 0 | 4 0 | 6 0 | 5 0 | 5 0 | 6 0 | 5 0 | 5 0 | 5 0 | 7 0 | 4 0 | 4 0 | 4 0 | 4 0 | 5 0 | 5 0 | 6 0 | 5 0 | 5 0 | 5 0 | 155 | 0 | 155 | 100 |
| | | In | 87 | 90 | 90 | 88 | 81 | 86 | 89 | 78 | 74 | 81 | 82 | 85 | 94 | 73 | 84 | 86 | 84 | 89 | 78 | 85 | 92 | 73 | 78 | 78 | 75 | 84 | 90 | 73 | 85 | 84 | 2500 | 876 | 3376 | |
| | | Toi | 25 | 24 | 27 | 28 | 28 | 25 | 23 | 31 | 27 | 33 | 31 | 28 | 24 | 26 | 24 | 26 | 24 | 32 | 30 | 30 | 30 | 29 | 33 | 30 | 32 | 34 | 38 | 26 | 31 | 31 | | | | |
| | | | 112 | 114 | 117 | 116 | 109 | 111 | 112 | 109 | 101 | 114 | 113 | 113 | 118 | 99 | 108 | 112 | 108 | 121 | 108 | 115 | 122 | 102 | 111 | 108 | 107 | 118 | 128 | 99 | 116 | 115 | | | = 3376 | |

Appendix 2 :

2.6. : Elimination response rates of patients in the experimental group (EII) during the post-experimental phase of Experiment II.

| Pair | Code | Incr. Rel. Freq. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total Incont. | Total Taken | Total Re. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 51 | In | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 5 | 80 | 85 |
| | | Tot. | 9 | 8 | 10 | 9 | 9 | 9 | 9 | 9 | 9 | 8 | | | |
| 2 | 31 | In | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 7 | 100 | 107 |
| | | Tot. | 10 | 9 | 11 | 10 | 9 | 10 | 9 | 11 | 11 | 10 | | | |
| 3 | 32 | In | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 4 | 85 | 89 |
| | | Tot. | 8 | 8 | 8 | 8 | 8 | 9 | 10 | 9 | 8 | 9 | | | |
| 4 | 15 | In | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 7 | 95 | 102 |
| | | Tot. | 11 | 9 | 9 | 11 | 9 | 10 | 10 | 8 | 9 | 9 | | | |
| 5 | 30 | In | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 89 | 89 |
| | | Tot. | 9 | 8 | 9 | 9 | 9 | 10 | 9 | 9 | 9 | 8 | | | |
| 15 | 35 | In | 1 | 1 | 1 | 1 | 1 | 3 | 0 | 1 | 1 | 1 | 11 | 78 | 89 |
| | | Tot. | 8 | 8 | 9 | 10 | 7 | 4 | 9 | 7 | 8 | 8 | | | |
| 10 | 39 | In | 3 | 2 | 2 | 4 | 2 | 2 | 2 | 3 | 3 | 3 | 26 | 79 | 105 |
| | | Tot. | 7 | 8 | 2 | 7 | 8 | 7 | 7 | 8 | 8 | 8 | | | |
| 11 | 81 | In | 0 | 2 | 2 | 4 | 1 | 1 | 0 | 2 | 1 | 0 | 13 | 79 | 92 |
| | | Tot. | 7 | 8 | 7 | 6 | 10 | 9 | 8 | 7 | 9 | 8 | | | |
| 6 | 85 | In | 2 | 2 | 3 | 2 | 1 | 0 | 3 | 2 | 2 | 1 | 18 | 84 | 102 |
| | | Tot. | 3 | 8 | 7 | 8 | 8 | 9 | 9 | 9 | 9 | 9 | | | |
| 9 | 42 | In | 4 | 2 | 3 | 4 | 3 | 3 | 3 | 5 | 1 | 0 | 28 | 73 | 101 |
| | | Tot. | 7 | 8 | 9 | 5 | 6 | 7 | 8 | 6 | 8 | 9 | | | |
| 13 | 14 | In | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 21 | 79 | 100 |
| | | Tot. | 9 | 7 | 7 | 10 | 10 | 7 | 9 | 7 | 7 | 9 | | | |
| 14 | 08 | In | 3 | 4 | 3 | 2 | 1 | 2 | 0 | 2 | 1 | 0 | 18 | 72 | 90 |
| | | Tot. | 6 | 6 | 8 | 7 | 8 | 8 | 8 | 7 | 6 | 8 | | | |
| 18 | 07 | In | 2 | 2 | 1 | 0 | 0 | 2 | 0 | 3 | 0 | 2 | 12 | 75 | 87 |
| | | Tot. | 9 | 7 | 7 | 8 | 9 | 7 | 8 | 4 | 8 | 8 | | | |
| 7 | 17 | In | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 0 | 54 |
| | | Tot. | 6 | 5 | 6 | 5 | 5 | 5 | 5 | 6 | 6 | 5 | | | |
| 8 | 16 | In | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 58 |
| | | Tot. | 8 | 4 | 7 | 6 | 3 | 5 | 5 | 7 | 6 | 6 | | | |
| 16 | 26 | In | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 3 | 75 |
| | | Tot. | 8 | 5 | 7 | 7 | 7 | 8 | 6 | 7 | 6 | 7 | | | |
| — | 23 | In | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 72 | 9 | 81 |
| | | Tot. | 8 | 3 | 3 | 8 | 8 | 7 | 6 | 7 | 7 | 8 | | | |
| | | | 155 | 153 | 163 | 153 | 149 | 151 | 128 | 151 | 147 | 146 | 486 | 1080 | 1506 |

← Days in Post-Exp. Phase →

| At Fol. 30 days. | | |
|---|---|---|
| Total Incont. | Total Taken | Total Re. |
| 15 | 240 | 255 |
| 21 | 300 | 321 |
| 12 | 255 | 267 |
| 21 | 285 | 306 |
| 0 | 267 | 267 |
| 33 | 234 | 267 |
| 78 | 237 | 315 |
| 39 | 237 | 276 |
| 54 | 252 | 306 |
| 84 | 219 | 303 |
| 63 | 237 | 300 |
| 54 | 216 | 270 |
| 36 | 225 | 261 |
| 162 | 0 | 162 |
| 174 | 0 | 174 |
| 216 | 9 | 225 |
| 216 | 27 | 243 |
| 1278 | 3240 | 4518 |

Appendix 2 :

2.7. : Recording of number of items of linen used due to incontinence in the pre- and post-experimental phases of Experiment I.

| Day | No. items soiled | | No. items wet | | Total no. items | | No. of patients | | Mean no. per patient | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pre | Post | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| 1 | 75 | 43 | 272 | 232 | 347 | 275 | 51 | 52 | 6·80 | 5·28 |
| 2 | 39 | 36 | 312 | 244 | 351 | 280 | 51 | 52 | 6·88 | 5·38 |
| 3 | 44 | 56 | 262 | 249 | 306 | 305 | 51 | 52 | 6·00 | 5·86 |
| 4 | 39 | 45 | 253 | 233 | 292 | 278 | 51 | 52 | 5·72 | 5·34 |
| 5 | 77 | 56 | 292 | 269 | 369 | 325 | 50 | 52 | 7·38 | 6·25 |
| 6 | 56 | 73 | 300 | 217 | 356 | 290 | 50 | 52 | 7·12 | 5·57 |
| 7 | 42 | 69 | 322 | 213 | 364 | 282 | 50 | 52 | 7·28 | 5·42 |
| 8 | 40 | 54 | 252 | 219 | 292 | 273 | 50 | 52 | 5·84 | 5·25 |
| 9 | 63 | 49 | 199 | 228 | 262 | 277 | 50 | 52 | 5·24 | 5·32 |
| 10 | 78 | 51 | 301 | 202 | 379 | 253 | 50 | 52 | 7·58 | 4·86 |
| 11 | 38 | 39 | 198 | 220 | 236 | 259 | 50 | 52 | 4·72 | 4·98 |
| 12 | 39 | 42 | 244 | 229 | 283 | 271 | 50 | 52 | 5·66 | 5·21 |
| 13 | 68 | 46 | 206 | 185 | 274 | 231 | 50 | 52 | 5·48 | 4·44 |
| 14 | 65 | 44 | 196 | 186 | 261 | 230 | 50 | 52 | 5·22 | 4·42 |
| 15 | 48 | 49 | 143 | 243 | 191 | 292 | 50 | 52 | 3·82 | 5·61 |
| 16 | 46 | 47 | 217 | 262 | 263 | 309 | 49 | 50 | 5·36 | 6·18 |
| 17 | 35 | 62 | 193 | 235 | 228 | 297 | 49 | 50 | 4·65 | 5·94 |
| 18 | 45 | 62 | 263 | 244 | 308 | 306 | 50 | 52 | 6·16 | 5·88 |
| 19 | 41 | 53 | 215 | 235 | 256 | 288 | 50 | 52 | 5·12 | 5·53 |
| 20 | 66 | 56 | 327 | 240 | 393 | 296 | 48 | 52 | 8·18 | 5·69 |
| 21 | 70 | 60 | 353 | 224 | 423 | 284 | 50 | 52 | 8·46 | 5·46 |
| 22 | 73 | 64 | 295 | 231 | 368 | 295 | 49 | 52 | 7·51 | 5·67 |
| 23 | 74 | 47 | 313 | 220 | 387 | 267 | 49 | 52 | 7·89 | 5·13 |
| 24 | 58 | 49 | 243 | 193 | 301 | 242 | 49 | 52 | 6·14 | 4·65 |
| 25 | 52 | 54 | 223 | 222 | 275 | 276 | 50 | 52 | 5·50 | 5·50 |
| 26 | 54 | 60 | 207 | 204 | 261 | 264 | 50 | 52 | 5·22 | 5·07 |
| 27 | 83 | 52 | 290 | 199 | 373 | 251 | 50 | 52 | 7·46 | 4·82 |
| 28 | 69 | 49 | 253 | 207 | 322 | 256 | 51 | 52 | 6·31 | 4·92 |
| 29 | 69 | 53 | 296 | 222 | 365 | 275 | 51 | 52 | 7·15 | 5·28 |
| 30 | 79 | 41 | 178 | 266 | 257 | 247 | 41 | 52 | 6·26 | 4·75 |

TOTAL NO ITEMS :- Pre-Exp = 9343 / Post-Exp = 8274

NO. ITEMS SOILED :- Pre-Exp = 1725 / Post-Exp = 1561

NO. ITEMS WET :- Pre-Exp = 7618 / Post-Exp = 6713

AVERAGE NO / DAY :- Pre-Exp = 311·43 / Post-Exp = 275·80

Appendix 2 :

2.8. : Degree of incontinence of patients in the total population at the four assessments.

| CODE | Ass. 1 | Ass. 2 | Ass. 3 | Ass. 4 | GROUP |
|---|---|---|---|---|---|
| 01 | 60 | 13 | - | - | EI |
| 02 | 100 | 98 | 100 | 85 | EI |
| 03 | 3 | 1 | 1 | 0 | - |
| 04 | 99 | 18 | 3 | 0 | EI |
| 05 | 61 | 21 | 15 | 24 | EI |
| 06 | 1 | 0 | 0 | 0 | - |
| 07 | 98 | 100 | 14 | 20 | CI/EII |
| 08 | 99 | 100 | 20 | 31 | CI/EII |
| 09 | 4 | 1 | - | - | - |
| 10 | 97 | 25 | 12 | 11 | EI |
| 11 | 97 | 100 | 100 | 82 | CI |
| 12 | 10 | 2 | 1 | 1 | - |
| 13 | 31 | 44 | 71 | 51 | - |
| 14 | 98 | 100 | 21 | 35 | CI/EII |
| 15 | 49 | 39 | 7 | 8 | CI/EII |
| 16 | 97 | 100 | 100 | 98 | CI/EII |
| 17 | 100 | 100 | 100 | 89 | CI/EII |
| 18 | 95 | 8 | 42 | 16 | EI |
| 19 | 97 | 15 | 24 | 29 | EI |
| 20 | 13 | 6 | 4 | 3 | - |
| 21 | 98 | 100 | 14 | 13 | CI/EII |
| 22 | 96 | 8 | 8 | 16 | EI |
| 23 | 6 | 0 | 0 | 0 | - |
| 24 | 3 | 1 | 0 | 0 | - |
| 25 | 98 | 100 | 18 | 17 | CI/EII |
| 26 | 98 | 12 | 13 | 10 | EI |
| 27 | 97 | 99 | 100 | 100 | EI |
| 28 | 97 | 8 | 8 | 15 | EI |
| 29 | 98 | 100 | 96 | 90 | CI/EII |
| 30 | 23 | 31 | 0 | 2 | CI/EII |
| 31 | 32 | 37 | 7 | 4 | CI/EII |
| 32 | 19 | 32 | 4 | 2 | CI/EII |
| 33 | 98 | 100 | 89 | 86 | EII |
| 34 | 7 | 5 | - | - | - |
| 35 | 97 | 100 | 12 | 11 | CI/EII |
| 36 | 97 | 100 | 100 | 90 | EI |
| 37 | 98 | 100 | 100 | 100 | - |
| 38 | 97 | 100 | 100 | 87 | CI |
| 39 | 99 | 100 | 25 | 15 | CI/EII |
| 40 | 33 | 7 | 1 | 4 | EI |
| 41 | 5 | 2 | 1 | 0 | - |
| 42 | 99 | 100 | 28 | 24 | CI/EII |
| 43 | 29 | 13 | - | - | - |
| 44 | 98 | 93 | 100 | 82 | EI |
| 45 | 98 | 27 | 12 | 14 | EI |
| 46 | 95 | - | - | - | - |
| 47 | 6 | - | - | - | - |
| 48 | 96 | 28 | 23 | 21 | EI |
| 49 | 28 | 10 | 4 | 11 | EI |
| 50 | 6 | 0 | 0 | 0 | - |
| 51 | 37 | 51 | 6 | 8 | CI/EII |
| 52 | 4 | 2 | 0 | 0 | - |
| 53 | 25 | 2 | 4 | 2 | EI |
| 54 | - | 1 | - | - | - |
| 55 | - | - | 1 | 2 | - |
| 56 | - | - | 2 | 3 | - |
| 57 | - | - | 100 | 44 | - |
| 58 | - | - | 100 | 54 | - |
| 59 | - | - | 93 | 67 | - |
| | N = 52 | N = 52 | N = 52 | N = 52 | |

# Appendix 3 :

## 3.1. : Method employed in the study of nurses' work activities.

The method adopted the method of structured observation by a non-participant observer (the researcher). A pilot study of continuous unstructured observation of nurses at work in two mental deficiency wards provided the basis for drawing up a list of nurses' work activities. This comprised 26 activities. This classification is contained in Appendix 3.2. and was used in the study undertaken in the experimental situation. A small pre-test was undertaken involving 4 nurses over four randomly-selected time periods.

A time period of 10 minutes was selected as the unit of observation. The study was planned to obtain 10 units of observation on each nurse working in the ward, these units divided equally between the morning and afternoon shifts. Random time periods were obtained as follows :- using a table of random numbers (probability of 1/10) 200 consecutive numbers were selected in which there were two digits, neither exceeding 6. The first digit was taken as the hour of a shift and the second as the (10-minute) time-period of that hour. (For example, number 22 corresponds to the second time-period of the second hour of the shift : ie 8.10 am - 8.20 am in a morning shift and 2.10 pm - 2.20 pm in an afternoon shift). Predetermined time periods were identified in this way for each nurse involved within the 3-week observation periods of the study.

The study was explained to the nurses in advance as follows :

> I shall be observing each of you at work on about ten separate occasions, each lasting 10 minutes. During these times I shall be watching what you are working at and writing down a brief description of your work activities on a recording sheet. I am not interested in how you are doing things, merely what you are doing. Noone will see the recording sheets, but you can look at your own if you like. At the times I am observing you, which you will not know in advance and which will be randomly assigned, please continue what you are doing and completely ignore me. Do exactly what work you would have done had I not been there. Please do not talk to me but, if I ask a question to clarify my observation, please answer that.

Only one observation per nurse was undertaken during any single shift and at least ten minutes lapsed between subsequent observations made by the researcher. The location of the nurse to be observed was ascertained prior to the observation period and the researcher took up position about half a minute before the 10-minute period was due to start. The position was usually to the side of the nurse, out of her vision, but with a clear view of her activity. If the time-period coincided with a meal break, or if the nurse was off the ward, the observation was delayed. All observations were made in the ward or immediate precincts and between the hours of 7.00 am and 10.00 pm. The first observation taken on each nurse was discarded in order to accustom them to the procedure.

Observations were recorded on a schedule as illustrated in Appendix 3.3. Description of the work activities was entered according to the work activity classification. In a multiple activity, the primary activity was recorded. (For example, if a nurse was washing a patient and talking to him, the activity of washing was taken as the primary activity).

Appendix 3 :
3.2. : Classification of nurses' work activity classes.

CLASSIFICATION OF NURSES' WORK ACTIVITIES

1. Feeding patients
2. Serving meals and assisting in dining room
3. Dressing / undressing patients
4. Dealing with clean linen and clothing
5. Disposing of / sluicing dirty linen
6. Getting out of /putting back to bed
7. Washing / bathing patients
8. Taking patients to toilet
9. Cleaning and changing incontinent patients
10. Disposing of / cleaning up excreta
11. Playing with patients
12. Recreational activities
13. Occupational activities
14. Preparing patients for off-ward activities
15. Discussion / interaction with non-nursing staff
16. Contact with patients' relatives
17. Meetings of nursing staff
18. Talking with patients
19. Patient training
20. Socialisation activities
21. Patient assessment
22. Technical nursing (incl. drugs)
23. Domestic chores
24. Nursing sick patients
25. Maintenance of ward equipment and environment
26. Nursing administration

Appendix 3 :

3.3. : Observation of nurses' work activities : Schedule.

SCHEDULE : OBSERVATION OF NURSES' WORK ACTIVITIES

NURSE : .....

CODE :

| OBSERVATION No. | DATE | TIME | CLASSIFICATION OF ACTIVITY | DESCRIPTION OF ACTIVITY | No. of other nurses | No. of other patients |
|---|---|---|---|---|---|---|
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |
| 5. | | | | | | |
| 6. | | | | | | |
| 7. | | | | | | |
| 8. | | | | | | |
| 9. | | | | | | |
| 10. | | | | | | |

Appendix 3 :

3.4. : Evaluation of nurses' practice of the experimental procedure : Schedule.

SCHEDULE : EVALUATION OF NURSES' PRACTICE IN EXPERIMENTAL PROCEDURE.

NURSE : .....

DATE :

1. MANAGEMENT OF INCONTINENCE :

Name of incontinent patient :
Time of reinforcement period : (mins)

Behaviour of nurse during management procedure :-

Was patient then toileted? Yes / No

If yes, complete section 2.

2. TOILET MANAGEMENT :

Behaviour of nurse in relation to :-

'going' :

'dressing' :

'sitting' :

'eliminating' :

Techniques used (underline) :-

shaping, prompting (verbal), prompting (physical),

modelling, reinforcement.

Reinforcement :-

Reinforcer (specify) :
Immediate : Yes/No
Effective : Yes/No

Other observations :-

3. Researcher's evaluation :

4. Question to nurse :

1. What are the current target behaviours for this patient?

2. What techniques did you use? Describe these.

3. Do you think that you procedure was according to those required? : Yes/No

If no, then why not?

4. Is this patient kept in anppies or not?

5. Points from discussion :-

Appendix 4 :
4.1. : Tierney ,.A.J. (1973) Toilet Training, Nursing Times, 20/27 Dec., 1740 -1745.

# Toilet training

Alison J. Tierney, BSc., RGN

THERE ARE many things wrong with our subnormality hospitals; conditions in some places are Dickensian and grotesque, in a few cases there is certainly unnecessary unkindness; but for the most part these patients are looked after by people who *care*, however misguided this form of treatment may be in the light of new knowledge about the possibilities of training the subnormal[1].'

One of these possibilities, increasingly gaining attention and credibility, is that of behaviour modification. The principles and techniques of behaviour modification, which can be found documented elsewhere[2-3], provide the framework of this study.

Despite the reliance upon psychological theory, the study is primarily a nursing study, and may hold implications for nurses and nursing.

First, the study aims to explore the potential of the nurse in subnormality to develop educational skills, a development of role refuted in the recommendations of the Batchelor Report[4], but acknowledged in those of the Briggs Report[5]. In the development and acquisition of educational skills, behaviour modification could play an important role.

Secondly, the study aims to explore one of the problems which exists in subnormality hospitals—that of incontinence. Incontinence is a problem for many reasons. It can become a health hazard, causing dysentery and other intestinal infections. It may detract from the potential and satisfaction of nurse-patient relationships. It may deny a patient total access to the range of social, educational, emotional and recreational experiences available in hospital. For example, often the incontinent patient is excluded from school, from excursions outside the hospital or ward, and even from the warmth of physical contact with the nurses, parents, or visitors.

Contrary to the current emphasis upon the desirability of community care, incontinence may result in admission to, and prevent discharge from hospital. Not least, incontinence may be said to result in an unpleasant and time-consuming task for nurses.

Thirdly, the study aims to contribute to the development of experimental method and design in nursing research.

## Behaviour modification and toilet training

A major discussion of the application of behaviour modification techniques to the toilet training of mentally subnormal patients is provided by Ellis[6] in a theoretical analysis of toilet behaviour from the viewpoint of behaviour theory.

Recurrent referral to Ellis' model is to be found in almost all of the subsequently published studies of toilet training. A review of these is provided by Rentfrow and Rentfrow[7].

It has been demonstrated that significant improvement in elimination control can be achieved. However, in many of the studies an immediate, or almost immediate regression to pre-training level of performance is reported. This regression appears to coincide with the transfer of the patients back to their usual living situation following training in a controlled, isolated and temporary environment.

It may be that this practice of selecting an 'artificial' environment with optimal training conditions, such as a constant and high staffing level, is related to the problem of regression. It suggests that the real challenge lies not in toilet training patients, but in keeping them trained. One study which was carried out in the patients' usual institutional environment reported that 'by the end of an eight-week period all five patients were eliminating consistently in the toilet', but no data are available to indicate how long this consistency was maintained.[8]

This study reports an attempt to toilet train a *group* of mentally subnormal patients in their *usual* ward environment, utilising the available complement of staff and existing resources, and minimising changes in the routine. Only if a programme can be implemented successfully under these conditions can it claim to have any immediate application to the toilet training of incontinent subnormal patients in the hospitals of this country.

The study was carried out in one ward of a NHS institution, The Royal Scottish National Hospital.

## Method

The central research method employed was that of the experiment. The study was carried out in three phases:

1. A pre-experimental phase of 30 days.
2. An experimental phase of 90 days (ie, the implementation of the behaviour modification programme in toilet training).
3. A post-experimental phase of 30 days.

During the pre-experimental phase data were gained using the methods of structured (non-participant) observation, abstraction from documents, and questionnaire. Data collection was carried out primarily by the researcher with the assistance of the nursing staff.

Data were gained on the patients, the staff, the environment, and aspects of incontinence.

*The patients.* The total population of the ward was 52 patients, of which 12 were female and 40 were male. Chronological age (CA) ranged from five to 21 years (the average age being 11·5 years). The range of mental age (MA) was four months to 22 months, as assessed by the Cattell Infant Intelligence Scale[9]. The level of functioning in the areas of self-help, communication, socialisation, and occupation was assessed for each patient on the Primary Progress Assessment Chart of Social Development[10]. Historical information on each patient was gained from nursing notes and medical case notes, and it was noticed that frequently one of the reasons for requesting the patient's first admission to hospital was that of double incontinence.

*The staff* consisted of trained nurses and nursing assistants (the term 'nurse' will be used to apply to both), the latter group being the majority. Records in-

***A report of an evaluation of the implementation of an experimental behaviour modification programme in toilet training with a group of severely subnormal patients***

dicated that the usual nurse/patient ratio varied between 1:10 and 1:17 (during any one daytime shift).

A questionnaire was given to the nurses who were working in the ward during the duration of the study. This was intended to give an indication of the nurses' perception of their role; their attitudes to incontinence, to the training of patients, and to research; and their knowledge of training methods, including behaviour modification.

The nursing staff who were involved in the study were not specially selected.

*The environment.* The ward in which the study was conducted was a bungalow-type building. It contained a large day room, four dormitories, and two sanitary annexes. These each contained three WCs, three wash-basins and two baths. There was one annexe at each end of the ward and these were used both for the changing of incontinent patients and for toilet sessions.

*Aspects of incontinence.* A record of all episodes of incontinence and toilet management which occurred in the ward was maintained during the 30-day period (24 hours/day). A total of 9,890 episodes was recorded (5,328 of incontinence and 4,562 of toilet management). The time and nature of the elimination was noted, as well as whether the episode was 'nurse-initiated' or 'patient-initiated'. Almost all of the episodes recorded were nurse-initiated (the nurse determined the nature and timing of the management of the episode). Patient-initiated episodes were usually related to incontinence rather than toileting when they did occur.

About 200 of the episodes were observed in detail, using the technique of functional analysis[4]. This technique allowed a clear definition of existing behaviour, a specification of events related to this behaviour (the stimulus conditions), and an isolation of the events which were acting as reinforcers to maintain the behaviour. This analysis revealed that patients display individual behaviour patterns related to elimination. For example, before elimination some patients recurrently became withdrawn, others hyperactive; some adopted a particular posture (squatting) or indulged in a specific activity (rocking).

The above data provided information about how often elimination occurred, when it occurred, and the pattern of behaviour associated with it.

Linen, wet or soiled as a result of incontinence was counted. A total of 9,343 items were recorded in the 30-day phase.

Observation of the nurses working in the ward was undertaken to determine the work load due to the management of incontinence and toileting of patients. Of the activities observed, 21·9% related to incontinence and 17·0% related to toilet management.

The data gained during the pre-experimental phase provided the baseline data. During the post-experimental phase data were gained on the same aspects and in the same way. A comparison of pre-experimental and post-experimental data determines the result of the experiment.

*Selection of patients.* The selection of an experimental and a control group was made on the basis of pre-experimental data to provide two groups as similar as possible (this was done by an independent assessor). Of the total population of 52 patients, 12 were considered to be already toilet trained, and were excluded from selection. In addition, four patients who were thought to be incompatible with the programme proposed on account of severe behavioural disturbance were excluded. Thus, from the remaining population of 36, two groups of 18 patients were selected. The groups were roughly similar with respect to CA, MA, diagnosis, general level of functioning, degree of incontinence, and degree of mobility. Within the two groups the range of MA was 4·2 to 22·6 months and the range of CA was 6 to 21 years. Severe disabilities included blindness, spasticity, and immobility.

Of the 18 experimental patients, five had been toilet trained by traditional methods for some time and were not maintained in nappies. The remaining 13 had not undergone recent training and were maintained in nappies.

*Training of nurses.* Before the experimental phase a training programme was introduced for the nurses who were to be involved in the programme. They were trained in small groups in the ward. The principles and techniques of behaviour modification, and their practical application to the toilet training programme, were taught by the use of lectures, films, discussions, and practical sessions. The development of appropriate attitudes was considered to be an important and integral part of training.

The training of the nurses was continued throughout the experimental phase. An attempt, on a small scale, was made to evaluate the effectiveness of training at the end of the programme. The experimental design and principles are adapted from those of Ellis[5].

The programme adopted the systematic application of the principles and techniques of behaviour modification, therefore centred upon the presentation of positive reinforcement immediately following appropriate behaviour. In brief, three main 'rules' were observed:

1. All incontinence and toilet behaviour is observed and recorded.
2. All appropriate toilet behaviour is reinforced.
3. All inappropriate behaviour (ie, incontinence or unacceptable toilet behaviour) is ignored.

Two aspects of toilet training were considered: Bladder and bowel training to aid the acquisition of bladder and bowel control, and the training of appropriate behaviour centred on using the toilet.

The first consideration was met by the planning of a temporal pattern of toilet sessions for the patients to accommodate to their usual time pattern of elimination (especially faecal elimination). This was done where possible on an individual basis, gradually increasing the number of sessions daily from two or three (to allow adaptation) to a maximum of 10. As bladder control was acquired this could be reduced to about eight. Each session of toilet training was limited to approximately 10 minutes. The programme was run daily between 7.00 am and 10.00 pm (the span of the two day shifts).

The second consideration of training was to develop appropriate behaviour centred on using the toilet. The technique of behaviour shaping encouraged a gradual development from the existing behavioural repertoire of the patients—that of elimination—to the state of highly complex behaviour described as independent toilet behaviour. This complex state, the target of the training programme, was defined as follows: 'That the patient goes to the toilet independently; removes his clothing independently; sits down on the toilet independently; and eliminates only in the toilet and is otherwise continent.'

It was essential to break down this complex behaviour into smaller pieces of behaviour to allow reinforcement throughout the behaviour-shaping sequence. This breakdown, based on extensive observation of response topographies in elimination, is illustrated in Fig. 1. The 'model' shows the breakdown of the defined target behaviour into four areas—'continence' (1-4), 'sitting' (5-8), 'dressing' (9-12), and 'going' (13-16).

Working from the base target behaviour through to the final target behaviour in each area represents a shaping sequence. Numbers 1-16 are notational and do not indicate the order of the overall shaping sequence, which varied between patients. This model was used in the programme in two ways. First, it was used to set the current target behaviour(s) for each individual patient. Secondly, it was used to record the progress of the individual patient throughout the programme. Thus, it could be easily ascertained what was the current behaviour, what behaviours had been established (and when), and what schedule of reinforcement was required for each patient. (Continuous reinforcement schedules were used with respect to current target behaviours. Once established, intermittent reinforcement was introduced'.) Progress was also recorded by cumulative records of response rates.

The individual needs and abilities of the patients were considered—each patient used equipment most suitable to his sitting ability (eg, WC, 'potty' or commode chair). Three of the patients attended the hospital school and their teachers were involved to maintain the continuity of the programme.

The positive reinforcers which were

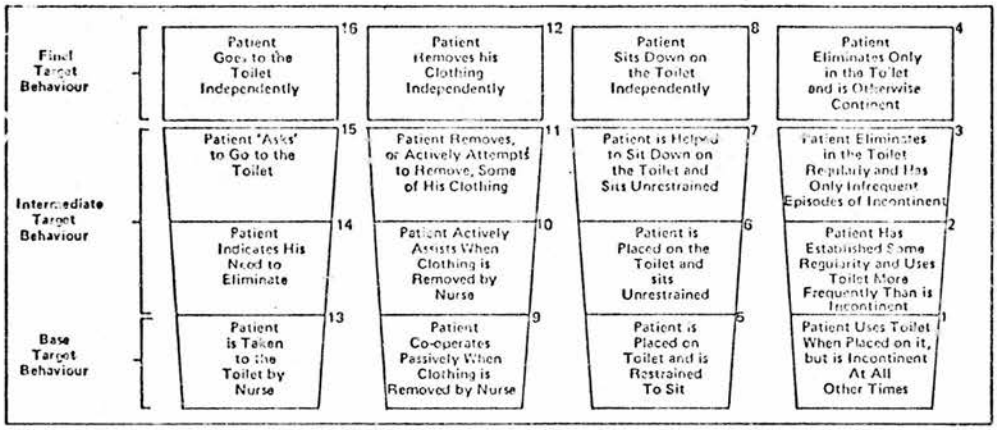



**Fig 1** A model of 'shaping' toilet behaviour

selected and used in the programme were also individual to each patient. Attention (social approval) was usually used in conjunction with a material or environmental reward. A wide range of reinforcers was used, such as sweets and toys.

During the experimental phase the above procedures were applied to the experimental group only. The patients in the control group were managed in all respects as they had been before the programme.

## Results and discussion

The results pertaining to the 18 experimental patients are considered in 1 and 2.

1. *Of the 18 patients, 14 in the experimental group displayed a reduction of incontinence and the acquisition of varying levels of continence and toilet behaviour* (see also Fig. 1).

Seven patients achieved consistent continence of urine and faeces (ie target behaviour 4.) Five achieved target 3. The remaining two patients reached target 2. In addition to this improvement during the day, six patients achieved nocturnal continence, thus indicating generalisation of learned behaviour. Nine of these 14 patients who, previous to the programme had been maintained in nappies, were managed without nappies by the end of the programme. Thus, the 14 patients under discussion were all 'out of nappies', during the night as well as the day.

The varying levels of toilet behaviour acquired are illustrated in Table 1. It can be seen that behaviour related to 'continence' (targets 1-4) and to 'sitting' (targets 5-8) were more easily acquired than those related to 'dressing' (targets 9-12) and to 'going' (targets 13-16).

This may indicate that behaviour more distant from the key behaviour (elimination) is more difficult to establish in a behaviour-shaping sequence. It may suggest that training was less consistent and less rigorous in these areas and, certainly the nurses appeared to place less importance on these than on the establishment of continence and, therefore, the essential requisite of sitting.

Targets 13-16 were the ones least maintained, if established at all, and these the nurses found difficulty in recognising due to the lack of verbal ability of the patients. It is interesting that the only patient (P.53) to achieve target 15 was the only patient able to verbalise, although non-verbal communication was included in the definition of this target. Target 16 was not achieved by any patient and this may have been due to the fact that the sanitary annexes were not usually accessible to the patients from the day room because of a locked door.

The variation in the number of target behaviours established and maintained by the patients within the 90-day period may be related to their level of functioning in other areas. Immobility obviously limited patients in the areas of 'dressing' and 'going'. It was interesting that mobility tended to increase as a result of the establishment of targets 5-8. For example one patient (P.22), at the start of the programme, was unable to sit without support or to balance his head, but, by the end, could sit independently and discovered that he could slide about the ward more quickly on his potty than by crawling.

The patients at the older end of the 6-21 CA range (P 48, 45 and 10) tended to show less achievement than the younger ones. However, an exception to this was P. 28 who, at 21 years of age, was in fact the oldest and she acquired the target behaviours shown in Table 1 within the first 30 days of the programme.

In the programme no attempt was made to discriminate between faecal and urinary elimination as has been done in many of the previous studies. For example, Giles and Wolf[7] state: 'Since bladder incontinence and bowel incontinence apparently are independent behaviours, it was felt that an attempt to modify both responses simultaneously would complicate the procedure. Therefore, only after some consistency of bowel control had been established, was urinating in the toilet reinforced'.

Although it appears from the cumulative records that faecal continence was, in fact, usually achieved before that of urinary continence there is no evidence from the present study to support the statement above. On the contrary, it could be said that the greater frequency of urinary elimination aided the establishment of targets 1-4 because the frequency increased the probability that the patient would respond, thus allowing reinforcement and therefore resulting in the strengthening of appropriate behaviour.

It will be noticed from Table 1 that none of the patients achieved the finally desired target behaviour and therefore could be considered completely 'toilet trained' within the 90-day period. This may indicate that, under the conditions selected, this length of time is inadequate. The time allowed in previous studies varied between six weeks and six months. However, it is not clear exactly what was achieved in the time allowed. It is obvious that the patients' varying levels of baseline ability have some bearing on the time factor. Although the assessment of the patients was made at the end of the prescribed period of 90 days, further training has been continued since then and further information on the factor of time will be available. However, this point is not of great importance if viewed in terms of the life expectancy of the patient—which may be as long as 50 years or more.

2. *Four patients in the experimental group showed minimal improvement*—see Table 1 (36, 44, 27 and 02). There is no obvious explanation for the lack of achievement in the toilet training of these four patients.

Some of the causes of incontinence

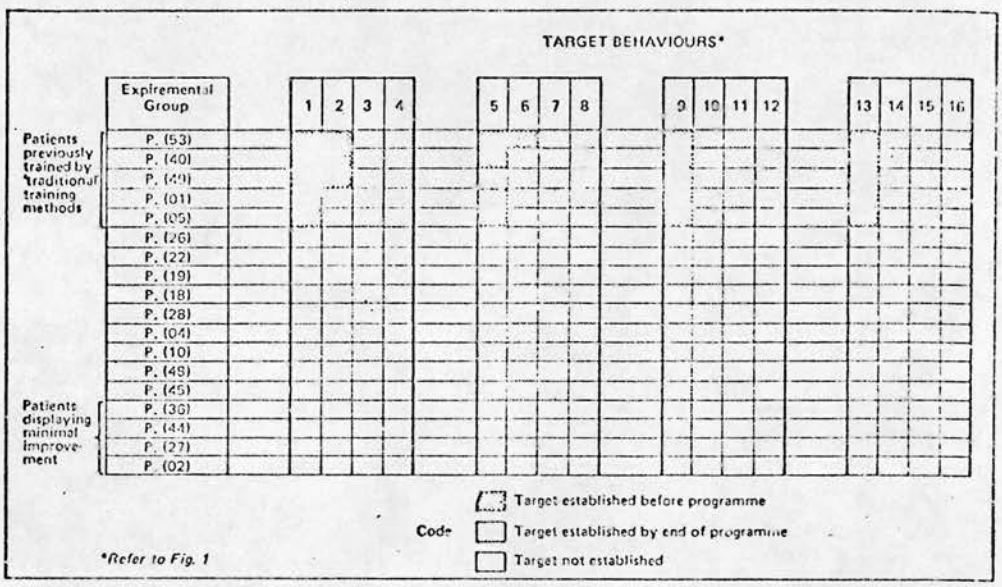



**Table 1** Target behaviours established in the experimental group

in normal children may be relevant to consider here[2]. Ellis[3] hypothesises that when a subnormal patient has not been successfully toilet trained the likely explanations are lack of training; decreased learning ability; or damage to central nervous system. He asserts that the first two explanations account for the greatest number of toilet training problems. In this case it may be fair to suggest that it was related to lack of training. The lack of progress in the initial stages of the programme, compared to that of other patients seemed to result in a less intensive effort by the nursing staff. For example, instead of a gradual increase in the number of toilet sessions for these patients, the number remained at two or three. On days when the toilet training programme could not be fully implemented it was these patients who 'got left out'. They remained in nappies throughout the programme. However, it is intended to implement an intensive and more individual toilet training programme for these patients in the near future and this may provide further information about the likely explanation for their lack of achievement in the present programme.

3. *The control group showed minimal improvement in the area of toilet behaviour.*

The patients in the control group were managed in all respects related to incontinence and toileting as they had been previously. This management could be described as 'traditional' and, although rewarding was practised as an integral part of this, it was neither consistent nor programmed. It can therefore be suggested, as substantiated by Gellfand, *et al*[3] that inappropriate as well as appropriate toilet behaviour is reinforced in 'traditional' toilet management.

As in the experimental group, there were five patients in the control group who, previous to the programme, had been managed without nappies and who had been undergoing traditional toilet training. Among these five patients in the pre-experimental phase, there was a total of 8·5 skills credited in the 'toilet and washing' section of the primary progress assessment chart (P-PAC). In the post-experimental phase, a total of 10·5 skills were credited showing minimal improvement. The remaining nine patients continued to be managed in nappies at the end of the 90 day period as at the beginning.

4. *The overall incidence in the ward of incontinence decreased.*

The total number of episodes of incontinence which occurred in the ward during the 30-day pre-experimental phase was 5,328 (an average of 177/24 hours). In the post-experimental phase this decreased to 4,436 (an average of 148/24 hours). This decrease can be attributed to the experimental group.

This result must be viewed in terms of the fact that the use of nappies as practised in the ward did not allow the actual number of incontinent eliminations to be recorded. Therefore, the real decrease in the number of incontinent eliminations cannot be calculated. [For example, if an experimental patient was 'in nappies' during the pre-experimental phase, the average number of incontinent eliminations recorded was approximately five (ie, the number of nappy changes). If, during the post-experimental phase, this number was reduced to two, then the decrease was three. However, assuming that patient eliminated 10 times per day during both phases, then the actual decrease was seven.]

5. *The amount of linen used due to incontinence decreased.*

The total number of items of linen used in the pre-experimental phase was 9,343 (an average of 311/24 hours) and this decreased to 8,274 (an average of 276/24 hours).

6. *The work load on the nursing staff due to the management of incontinence decreased.*

In the pre-experimental phase 21·9% of all activities observed were related to the management of incontinence and, in the post-experimental phase, this was reduced to 15·2%.

The percentage of activities observed relating to toilet management increased from 17·0% to 22·6%.

The total percentage of activities relating to the patients' elimination was therefore decreased from 38·9% to 37·8%. This decrease is indeed small. However, it does show: (1) That the implementation of the toilet training programme did not result in demanding more time from a nursing staff who had none to spare; (2) that a programme of this nature may be successfully implemented in the usual environment, using the available complement of staff; (3) that a re-allocation of time that is of benefit to the patients may be achieved; (4) that this may be of benefit to the nurses in demanding a therapeutic rather than a custodial role.

It can be anticipated that the amount of time spent in the toilet management of the experimental patients should decrease as improved bladder control results in longer retention time of urine

and therefore fewer toilet sessions. Also, if the patients achieve the ability to go to the toilet independently, then the nurses' involvement can further be reduced.

Table 2 presents some of the data gained from the observation of the nurses working in the ward. Those activities which occurred most frequently (high incidence activities) were those commonly termed 'self-help' skills. Those which occurred least frequently (low incidence activities) were those of a 'social' nature. In the pre-experimental phase, self-help skills accounted for 68·7% of all activities, and social skills for 4·0%. In the post-experimental phase, self-help skills accounted for 64·5% and social skills for 10·3% of all activities. This result does suggest that the acquisition of an educational role by the nurses has generalised to other areas of patient behaviour although this cannot be viewed as a direct effect of the study. The activity of 'training patients in basic habits' excludes toilet training (which is included in the activity of 'toilet management').

The increase in training in other areas was mainly related to 'feeding' and 'dressing', and it can be seen that these activities have decreased in incidence in the post-experimental phase. 'Talking with patients' increased as an exclusive activity, an important aspect of the development of the nurse's role in the socialisation of patients[4].

7. *The general level of functioning of subjects in the experimental group increased greatly.*

The training programme undertaken with the experimental group was intended to concentrate on skills related to toilet behaviour—as indeed it did. However, it is interesting that the general level of functioning of these patients increased in relation to many other types of skills.

This result is shown by the data provided in the P-PAC, the assessment used for the experimental and control patients before and after the experiment, a time span of 5-6 months. This chart provides a visual impression of the general functioning of mentally subnormal patients at the lowest stage of social development. The skills, described as those of self-help, communication, socialisation and occupation are arranged in order of maturational development. Repeated assessments indicate the degree of progress or regression, whether training has been effective, and which areas require concentrated attention. This assessment can be used by nurses and is a useful tool in the planning and assessment of training programmes.

Table 3 illustrates the number of skills gained. It can be clearly seen that the general level of functioning of the experimental group increased to a much greater extent than that of the control group.

This result is interesting and may indicate that a period of intensive training concentrating on one aspect of behaviour produces generalised effects. It is intended to study the pattern of development of these patients over a prolonged period in order to investigate whether there was an acceleration of development during the duration of the period of intensive training.

| Nature of Activity | Pre-exp. Incidence | Post-exp. Incidence |
|---|---|---|
| A | | |
| Management of Incontinence | 21·9% | 15·0% |
| Toilet management | 17·0% | 22·6% |
| Feeding | 12·9% | 11·3% |
| Dressing | 9·9% | 8·7% |
| Washing and bathing | 7·0% | 6·9% |
| B | | |
| Recreational activities | 0·4% | 1·3% |
| Occupational activities | 0·4% | 0·9% |
| Talking with patients | 1·6% | 3·4% |
| Training in Basic Habits | 1·6% | 1·3 |
| Socialisation activities | 0·0% | 0·4% |
| C: Others | 27·3% | 25·2% |

A: High incidence activities (self help)
B: Low incidence activities (social)

Table 2 High and low incidence activities

The data provided by the P-PAC merit further statistical analysis and, without this, these data cannot be fully discussed at present.

## Replication of the experimental behaviour modification programme

Replication is an important aspect of research utilising the method of the experiment, and validation allows greater consideration of the results obtained in terms of their generality.

A replication of the experimental behaviour modification programme reported has recently been completed in the same ward. Responsibility for the implementation of this programme was accepted by the ward nursing staff, the role of the researcher being to provide support and supervision.

The replica programme was implemented in all respects as was the experiment reported. Data gained during the post-experimental phase of the experiment reported provided the baseline data for the replica programme. The 17 patients involved in the replica programme were largely those selected to the control group in the experiment reported.

The results of the replica programme are strikingly similar to those of the experiment reported. Of the 17 patients involved in the replica programme, four showed minimal improvement while 13 displayed a reduction of incontinence and the acquisition of varying levels of continence and toilet behaviour. The varying levels of toilet behaviour acquired are illustrated in Table 4, and the amount and distribution of target behaviours established can be seen to be similar to those of the experimental group (see Table 1).

The overall incidence of incontinence in the ward was further decreased following the replica programme (from an average of 1·48 episodes of incontinence per 24 hours to an average of 1·16/24 hours). The amount of linen used due to incontinence was also further reduced (from an average of 276 items per 24 hours to an average of 231/24 hours). The general level of functioning (as assessed by the P-PAC) of patients involved in the replica programme increased greatly, this result substantiating the suggestion that there is an acceleration of development during a period of intensive training.

## Conclusion

During a period of one year, 35 incontinent patients have been involved in an experimental behaviour modification programme in toilet training and its replica. Evaluation undertaken during this period shows that a considerable change has taken place in the profile of the ward involved in terms of its incontinence. This changing profile is illustrated in Table 5.

At present, further programmed training is under way for those patients who showed minimal improvement during the experimental programme or its replica. This may result in further change of the ward's profile.

A long-term follow-up evaluation study is planned and this should provide data concerning the degree of regression or improvement subsequent to the toilet training programmes. As suggested earlier, the real challenge lies not just in training patients, but in keeping them trained.

Table 3 Skills gained by experimental and control groups in the Pre- and Post-experimental assessments

| Primary progress assessment chart | | | | | | |
|---|---|---|---|---|---|---|
| Section of P-PAC | Experimental | | | Control | | |
| | Pre-Exp. | Post-Exp. | Gain | Pre-Exp. | Post-Exp. | Gain |
| Self-help | 286 | 402 | 116 | 280 | 300 | 20 |
| Communication | 173 | 237 | 64 | 199 | 211 | 12 |
| Socialisation | 100 | 154 | 54 | 117 | 130 | 13 |
| Occupation | 180 | 254 | 74 | 201 | 223 | 22 |
| Total | 739 | 1047 | 308 | 797 | 864 | 67 |

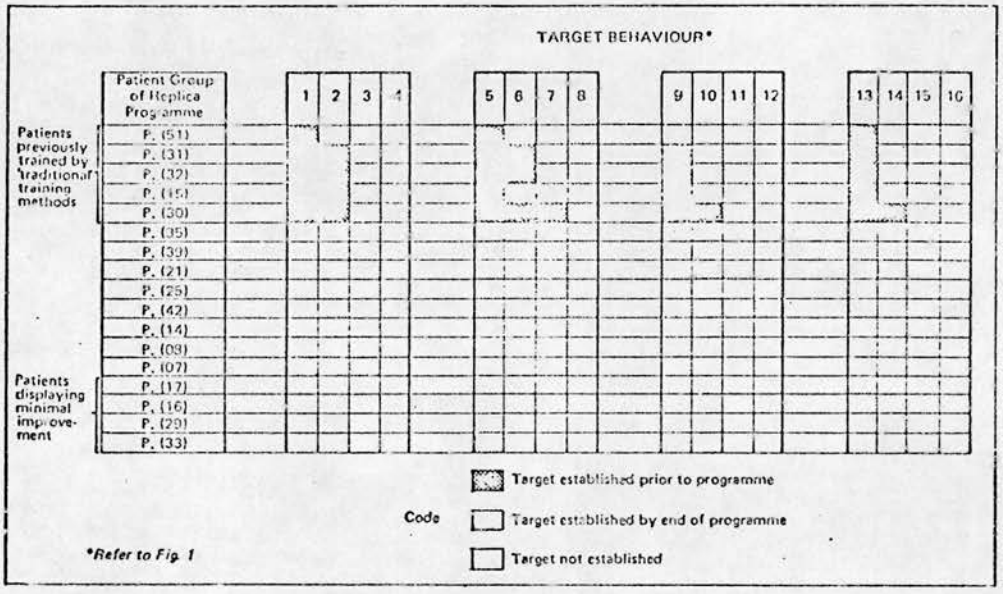



**Table 4** Target behaviours established in the patient group of the replica programme

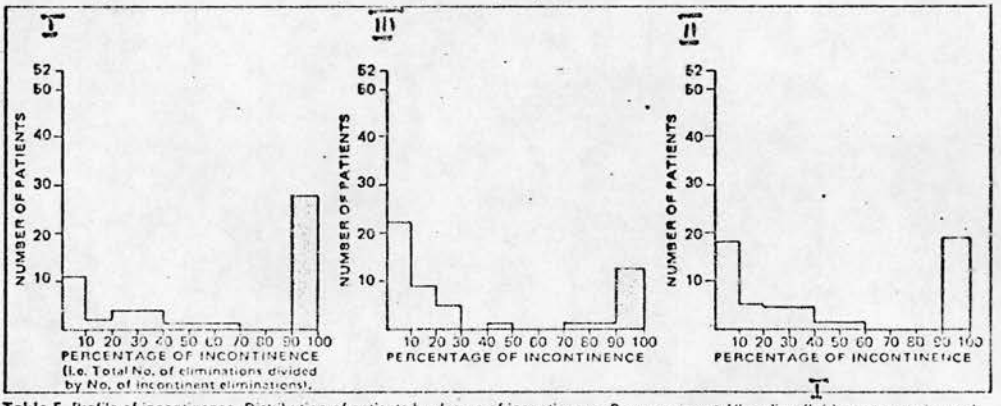



**Table 5** Profile of incontinence. Distribution of patients by degree of incontinence. Pre-experimental/baseline (left), post-experimental (centre), following replica programme (right)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Mrs Tierney is a lecturer in the department of nursing studies, University of Edinburgh.

Appendix 4 :
4.2. : Miscellaneous correspondance arising from Tierney (1973).

# The wrong approach

Sir—Alison Tierney's article on Toilet Training (December 20/27) represents a most interesting and ingenious piece of research. It is, however, unfortunate to see her straining to apply a patently inappropriate theoretical framework to her data. Her basic mistake is to neglect the fact that the social life of a hospital ward is the outcome of a series of *interactions* in which both nurse and patient participate. Through these interactions, especially in a total institution like a subnormal hospital, nurses and patients derive their sense of self.

In important respects our sense of the sort of people we are depends upon how others see us and act towards us. In the typical total institution, however much staff may care, patients tend to get reduced to objects who are routinely managed for administrative convenience rather than as co-participants in the life of the institution. Hence the well known phenomen of apparent regression among prisoners, psychiatric patients and subnormal patients. These people regress because they are not allowed by the staff to progress or to maintain normal functioning as human beings.

Mrs Tierney cites research showing the collapse of improvements in elimination control on return to the normal setting. Her data also show how most elimination in the pre-experimental phase was initiated by nurses at their convenience rather than by patients.

This research is interesting in its attempt to modify behaviour in a normal ward rather than an experimental setting. However it is clear that Mrs Tierney has made far-reaching modifications in the social relationships within the ward. She involved the staff in an extensive training programme to modify their knowledge and expectations of the patients and sustained this throughout the experiment. She shows how some patients did not progress because the staff became' discouraged by their slow response and decreased their involvement. Their expectations were not sustained and the patients responded to this.

Most crucial is Mrs Tierney's statement that the general level of functioning of the experimental subjects increased. This is entirely predictable from the perspective I have been outlining although it seems to surprise the author. If staff actions have been modified so that they are interacting with patients on the basis of a different set of expectations then one would expect extensive modifications of patient behaviour.

These points may appear academic and trivial but they have important implications for staff action. As Mrs Tierney says, the challenge lies not in training patients but in keeping them trained.

Mrs Tierney's data show that the problem lies as much with the staff. Until staff in subnormal hospitals can be brought to recognise that their patients are human beings with human potential then we can hope for little improvement. Behaviour modification techniques may provide a useful set of methods for systematising and redirecting staff behaviour but they work for different and more complex reasons than their proponents would have us believe. Their application is ultimately limited to fairly simple tasks.

It would be a pity if the growing body of nursing research which can produce work of this care and methodological quality should allow itself to be seduced by a theoretical approach which is becoming increasingly discredited and can surely only have appeal for its scientistic aura.

*Robert Dingwall*
*Research student*
*Medical Research Council*
*Aberdeen*

## Toilet training

Sir—I will not engage in defending the theoretical framework which I selected as the basis of my research (Toilet Training, December 20/27) for Mr Dingwall and I have had previous dialogue on this subject. He chooses to reassert his view that it is 'The wrong approach' (January 17).

However, while commending the care and methodological quality of the work, he fails to understand the implications of the results. Mr Dingwall's explanation does not account for the fact that the patients in the control group did not show behavioural change similar to those in the experimental group in the controlled experiment. It must be deduced therefore that this difference was due to the experimental influence, that is, the application of the behaviour modification toilet training programme to the experimental group only. The increase in the general level of functioning also related to the experimental group only. These data unequivocally dispute Mr Dingwall's interpretation.

Mr Dingwall may well have appreciated these differences. If so, then he is choosing to describe the experimental effect in terms of sociological theory. In that case, the discussion is reduced to an argument on semantics.

The nursing profession does not have the reputation of being easily seduced by innovation and, I hope, not easily swayed by the 'scientistic aura' of behaviour modification nor by that of Mr Dingwall's approach. Can we really accept as genuine his concern for the nursing profession when he makes the statement that 'Until staff in subnormal hospitals can be brought to recognise that their patients are human beings with human potential then we can hope for little improvement'?

It may be proved that behaviour modification *is* the wrong approach. However, it has been shown to have useful application to the training and rehabilitation of mentally subnormal patients. What application has Mr Dingwall's approach had to problems such as incontinence, which confront nurses who care for, and care about, such patients?

*(Mrs) Alison J. Tierney*
*Lecturer*
*Department of Nursing Studies*
*University of Edinburgh*

Sir—Thank goodness for Alison Tierney's research on toilet training (December 20/27). Nurses will have much to learn from it and, hopefully, patients will profit from it. Indeed some have already done so.

Robert Dingwall (January 17) uses rather emotive phrases as he dismisses the theoretical approach to the study. His statement of the obvious—that the social life of a hospital ward is the outcome of a series of interactions in which both nurse and patient participate—is an over-simplification and the suggestion that this has been neglected seems extraordinary. Perhaps for non-nurses this required to be more clearly stated but as Mrs Tierney indicated her study is a nursing one.

The crushing comments used by Mr Dingwall to describe care in long-stay hospitals signify a limited understanding of a vast undertaking to effect change and gravely under-rate the work of those who are contributing so much to the change. There are very real problems in achieving change and a satisfactory standard of care.

Recognition of the need for change is perhaps now the harsh difficulty to overcome. There is the period of education and training, there may be financial difficulties and there are almost certain to be manpower problems.

All praise to those working constructively towards change, and congratulations to Alison Tierney.

*M. H. S. Hunter*
*Edinburgh*

Sir—With reference to the research report Toilet Training (December 20/27), please note the following error in addition to those corrected in the issue of January 10: Table 5 (page 1745)—The pre-experimental baseline is to the left; the post-experimental baseline is to the right; the profile following the replica programme is in the centre.

*(Mrs) Alison J. Tierney*
*Lecturer*
*Department of Nursing Studies*
*University of Edinburgh*

## Relevant research

Sir—Robert Dingwall's detailed comments (January 17) on Alison Tierney's article on toilet training are very interesting. Basically, he accepts that improvement in the patients has occurred, and this improvement has spread to other areas. He then makes these specific points: first, that more than operant conditioning is going on in this situation; second, that an operant conditioning model is an inappropriate and theoretical framework to apply to the data.

I should like to comment on these two points. More is going on in this situation than a bare set of behaviour modification procedures. *No* ward programme will work unless the staff recognise the human potential of their patients, unless they have positive expectations, unless they *do* interact with patients.

But these general factors operate in *any* ward, and don't, as far as I am aware, stop drugs being prescribed or operations carried out. It is so easy to say that treatment involves this, or involves that. Because the whole cocktail of factors work in the end, we may not take the trouble to find out what the real active ingredient is, and Mrs Tierney's study seems a step towards finding that out.

While some zealous disciples of B. F. Skinner may see operant conditioning as a panacea for all ills, Mrs Tierney does not take this stand. Behaviour modification principles provide a useful framework for viewing many problems previously thought intractable, and have generated a set of techniques applicable in many settings.

Research such as Mrs Tierney's is not conceived to prove a theory, but to demonstrate an efficient procedure that is relevant to a most unpleasant chore undertaken daily by thousands of nurses. A sweeping statement that behaviour modification is 'becoming increasingly discredited' is itself easily discredited, especially in the absence of any alternative formulation by Mr Dingwall.

*J. N. Hall, BA, MSc*
*Research Fellow*
*Department of Psychiatry*
*The University of Leeds*

## Relevant research

Sir—Robert Dingwall is entitled to criticise Alison Tierney's approach to research into toilet training (January 17), but it is unfortunate that in doing so, he is also criticising the staff of the hospital in which the research has been carried out.

Mrs Tierney was not writing about 'typical total institutions', nor about a 'place in which patients tend to get reduced to objects', nor, in general, about 'staff in subnormal hospitals'. She was writing about a specific group of severely subnormal patients devotedly cared for by a specific group of dedicated, hard-working, enthusiastic people who do not need any lesson from Mr Dingwall to recognise that their patients are human beings. They showed by their successful efforts in speeding the development of the patients that they needed help in identifying, quite specifically for each patient, what level of potential could be aspired and could be reached.

*Annie Altschul*
*Lecturer*
*Department of Nursing Studies*
*University of Edinburgh*



## Toilet training

Sir—It would seem that Robert Dingwall (January 17) has a bee in his bonnet about the use of behaviour modification.

I think that it is generally accepted that a response-reinforcement theory of learning leaves a lot to be desired, and a lot of things unexplained, for example the process of illiciting initial response.

However I doubt very much if Mrs Tierney (December 20/27) has neglected to recognise the importance of social interaction and the Goffmanian implications of a total institution. In fact most behaviour modifiers in hospital see the correct scheduling of social contact as a powerful reinforcer of desirable behaviour. A simple increase in staff-patient interaction cannot guarantee patient improvement without systematic application.

Over the years nursing staff in our large psychiatric and subnormality hospitals have possibly seen thousands of 'cures' for the common ills, ranging from witchcraft to the application of ethological concepts, and sometimes back to witchcraft again, promulgated by those who had a new 'theory'. It can be safely said that the application of behavioural techniques has come the closest to tackling the actual problems at hand.

This does not mean that given a more superior applicable theory to work from nurses would stick doggedly to a response reinforcement model. It would be very nice for instance, if we could apply an incentive-motivational idea to our problems which, theoretically, may seem more sound.

Yet we must remember that in hospitals it is a real world that we live in, and unlike the 'rat men' in their labs we cannot say 'This is scientifically impure, let us look for something else'. We have to take the view that 'Although this approach may not be pure it is better than anything to date, and because it works we use it until we find something better'.

I would not go as far as to say that the points made by Mr Dingwall were trivial but I would agree that at this stage they are academic.

It seems obvious that Mrs Tierney is not out to sell any particular theory, but to utilise the best that we have in order to improve the quality of life of her patients. This I think she has done quite effectively.

*Paul A. Walsh*
*Research Nurse*
*Department of Psychiatry*
*University of Oxford*

Appendix 5 :
5.1. : Copy of initial letter and questionnaire.

The DEPARTMENT OF NURSING STUDIES,
University of Edinburgh,
Adam Ferguson Building,
George Square,
EDINBURGH EH8 9LL.

20 August 1974

The Principal Nursing Officer
(or Senior Nurse Administrator),

Dear Sir or Madam,

re A Study of Nurse Involvement in the Application of Behaviour Modification Techniques to Hospitalised Mentally Subnormal Patients in Scotland (1974).

During the past three years I have been undertaking nursing research into the application of behaviour modification techniques to mentally subnormal patients by nurses. My work is supported by the Scottish Home and Health Department, and is supervised by Miss A. Altschul and Dr. D.A. Primrose.

Having completed the main study, concerned with the evaluation of an experimental behaviour modification toilet training programme, my work has centred upon a study of the role of the nurse in behaviour modification and the training of the nurse towards such a role. As a member of a Specialist Panel of the Committee for Clinical Nursing Studies I was closely involved with the development of the Outline Syllabus in Behaviour Therapy in Psychiatric and Mental Handicap Nursing. In anticipation of the setting up of courses in Behaviour Therapy, and other developments in nurse training, I am presently undertaking the study titled above. This aims to gain information about the nature and extent of nurse involvement in behaviour modification and about the needs of nurses regarding appropriate training and support.

The study will, firstly, establish in which of the hospitals for the mentally subnormal in Scotland are nurses presently involved in behaviour modification and, secondly, gain information on the nature and extent of this involvement where it exists. It is hoped that the second stage of the study, where hospitals are willing to participate, will be undertaken by personal visits involving formal and informal discussion with nursing staff. This method of study would avoid engaging busy administrators in postal questionnaires, replicating previous studies and minimising the usefulness of the information obtained.

I hope that the above information clarifies the reasons for, and the aims and methods of, the study and that you will respond to my request to you for your help and co-operation. I should be very grateful if you would provide the essential information for the first part of the study by completing the brief questionnaire enclosed and by returning it to me at the above address at your very earliest convenience. In the event of your willingness to consider further participation in the study I shall contact you later this month in order to give you full details and to make the necessary arrangements with you.

I have sent a copy of this correspondance to the Chief Area Nursing Officers for their information. I look forward to your reply and thank you most sincerely in anticipation of your help.

Yours sincerely,

Mrs. Alison J. Tierney, B.Sc., R.G.N.,
Lecturer.

Enclosures : "Toilet Training",
Outline Syllabus in Behaviour Therapy in Psychiatric and Mental Handicap Nursing,
Questionnaire.

## NURSE INVOLVEMENT IN BEHAVIOUR MODIFICATION

Please complete this Questionnaire either by circling the appropriate responses or by written comments when required. Thank you.

1. Name and Address of Hospital :-

2. Are nursing staff in the above Hospital presently involved in any way in Behaviour Modification (or behaviour therapy or operant conditioning or token economy) ?

YES / NO

3. If nurses are NOT presently involved in any way,

(a) Have they been involved in the past? YES / NO

(b) Might they be involved in the future? YES / NO

4. If nurses ARE involved in some way with behaviour modification, please briefly describe the nature and extent of their involvement. (Include, for example, details of the number of nurses involved, the type of behaviour modification programme(s) underway, the type and number of patients involved. )

5. Are you willing to consider further participation in this study (if nurses in your Hospital are involved in behaviour modification) to any extent?

YES / NO

Signature : _____

Name and Designation : _____

_____

Date : _____

Appendix 5 :
5.2. : Copy of letter to C.A.N.Os.

The DEPARTMENT OF NURSING STUDIES,
University of Edinburgh,
Edinburgh.

20 August 1974

The Chief Area Nursing Officer,
Health Board :

Dear Sir or Madam,

For your information I enclose a copy of the correspondance sent in relation to a nursing study to the senior nurse administrator of each mental handicap hospital in Scotland. I should be very pleased to provide you with any further information which you might require about this matter. I should be very grateful if you might give this study your support by encouraging response to my request for help should the occasion arise.

With thanks,

Yours sincerely,

Mrs. Alison J. Tierney,
Lecturer.

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